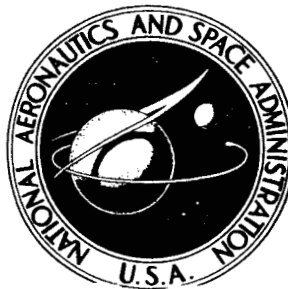


**NASA CONTRACTOR
REPORT**



NASA CR-174

NASA CR-174

FACILITY FORM 802

N65 18501
(ACCESSION NUMBER)

(THRU)

(PAGES)

(CODE)

(NASA CR OR TMX OR AD NUMBER)

(CATEGORY)

GPO PRICE \$ _____

OTS PRICE(S) \$ _____

Hard copy (HC) _____

Microfiche (MF) _____

**THE EFFECT OF BEDREST
ON VARIOUS PARAMETERS
OF PHYSIOLOGICAL FUNCTION**

**PART IV. A SYSTEM FOR
PROCESSING DATA COLLECTED
IN THE IMMOBILIZATION STUDY UNIT**

*by C. Vallbona, W. A. Spencer, W. Blose,
D. Cardus, F. B. Vogt, and J. Leonard*

Prepared under Contract No. NAS 9-1461 by
TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH
Houston, Texas
for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION • WASHINGTON, D. C. • MARCH 1965

THE EFFECT OF BEDREST ON VARIOUS PARAMETERS
OF PHYSIOLOGICAL FUNCTION

PART IV. A SYSTEM FOR PROCESSING DATA COLLECTED IN THE
IMMOBILIZATION STUDY UNIT

By C. Vallbona, W. A. Spencer, W. Blose, D. Cardus,
F. B. Vogt, and J. Leonard

Distribution of this report is provided in the interest of
information exchange. Responsibility for the contents
resides in the author or organization that prepared it.

Prepared under Contract No. NAS-9-1461 by
TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH
Houston, Texas

for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

THE EFFECT OF BEDREST ON VARIOUS PARAMETERS
OF PHYSIOLOGICAL FUNCTION
PART IV. A SYSTEM FOR PROCESSING DATA COLLECTED IN THE
IMMOBILIZATION STUDY UNIT

By C. Vallbona, M.D., W. A. Spencer, M.D., W. Blose, D. Cardus, M. D.
F. B. Vogt, M.D., and J. Leonard

ABSTRACT

18501

The establishment of the Immobilization Study Unit for evaluating the effects of bedrest required a system for processing, storing, and retrieving the data collected during the studies. A system was developed that permitted entries to punch cards of data pertaining to the subject's identification, medical history, and physiological and sociological behavior during the study. Source documents of fixed format were used for collecting data at the bedside and in the laboratories. Analog to digital conversion was achieved by manually operated automatic digitizers. Several computer programs were written that permitted application of mathematical and statistical models to the analysis of the data collected.

Butt

FOREWORD

This study is a part of a NASA investigation of the effect of bedrest on various parameters of physiological function. It was sponsored by NASA Manned Spacecraft Center under Contract NAS-9-1461, with Dr. Lawrence F. Dietlein, Chief, Space Medicine Branch, serving as Technical Monitor.

This study was conducted in the Immobilization Study Unit of the Texas Institute for Rehabilitation and Research, The Texas Medical Center. The following authors are affiliated with Baylor University College of Medicine: Dr. Vallbona (Departments of Rehabilitation, Physiology, and Pediatrics), Dr. Spencer (Department of Rehabilitation), Dr. Cardus (Departments of Rehabilitation and Physiology), and Dr. Vogt (Department of Rehabilitation). Mr. Leonard is affiliated with the Data Systems Development Branch, NASA Manned Spacecraft Center, Houston, Texas.

The authors wish to express their appreciation for the participation of the Staff of the Biomathematics Research Laboratory of Baylor University College of Medicine and of the Data Systems Development Branch of the NASA Manned Spacecraft Center. Special acknowledgement is made to Mr. Rex Talbert and Mr. John Cowan of the Instrumentation and Electronics Systems Division of the NASA Manned Spacecraft Center who provided support for the program for analog to digital conversion of data; also, to Miss S. Beggs and Mrs. D. Bellis in the preparation of the manuscript and research assistance.

TABLE OF CONTENTS

| | |
|--|----|
| FOREWORD | v |
| SUMMARY | 1 |
| INTRODUCTION | 1 |
| THE MASTER FILE SYSTEM | 2 |
| A. Subject's data | 3 |
| B. Environmental factors | 6 |
| C. Census | 6 |
| D. Task assignments | 6 |
| E. General administration | 7 |
| F. Personnel activities | 7 |
| PROCESSING OF ANALOG DATA | 7 |
| ANALOG RECORD EDITING | 11 |
| SEMI-AUTOMATIC ANALOG TO DIGITAL CONVERSION | 12 |
| COMPUTER PROGRAMS | 12 |
| A. Computer programs for measurements of cardiac dynamics | 12 |
| B. Computer programs for measurements of circulatory dynamics | 16 |
| C. Measurements of circulatory dynamics during a Valsalva maneuver | 22 |
| D. Ergometry test data | 22 |
| E. Laboratory data | 24 |

| | |
|---|----|
| CONCLUSION | 24 |
| REFERENCES | 27 |
| APPENDIX (The documents contained in this appendix are copies of the actual source documents used to gather various data for the study.) | 28 |
| Document 1. Basic identification information | 28 |
| Document 2. Face sheet with additional information. | 29 |
| Document 3. Immobilization study subject candidate questionnaire | 30 |
| Document 4. Social Service questionnaire | 50 |
| Document 5. Bedside information document | 62 |
| Document 6. Bedside information document | 63 |
| Document 7. Hematology source document | 65 |
| Document 8. Routine urinalysis source document | 66 |
| Document 9. Blood chemistry source document | 68 |
| Document 10. Urine chemistry source document | 69 |
| Document 11. Routine fecal analysis source document | 70 |
| Document 12. Food analysis source document | 71 |
| Document 13. Sample document of protocol for one day of second study | 72 |

THE EFFECT OF BEDREST ON VARIOUS PARAMETERS
OF PHYSIOLOGICAL FUNCTION
PART IV. A SYSTEM FOR PROCESSING DATA COLLECTED IN THE
IMMOBILIZATION STUDY UNIT

By C. Vallbona, M.D., W. A. Spencer, M.D., W. Blose, D. Cardus, M.D.
F. B. Vogt, M.D., and J. Leonard

SUMMARY

The establishment of the Immobilization Study Unit for the purpose of evaluating the physiological effects of bedrest required the provision of a system for processing, storing, and retrieving the data collected in the course of the studies.

A system was developed that permitted entries to punch cards of data pertaining to the subject's identification, past medical history, and physiological and sociological behavior during the study. Source documents of fixed format were used for collecting data at the bedside and in the laboratories. Analog to digital conversion was achieved by means of manually operated automatic digitizers. Several computer programs were written that permitted application of mathematical and statistical models to the analysis of the data collected.

INTRODUCTION

In May 1963, the staff of the Texas Institute for Rehabilitation and Research and the staff of the Crew Systems Division of the Manned Spacecraft Center of Houston, Texas, organized an Immobilization Study Unit to investigate the effects of prolonged bedrest in healthy subjects and to evaluate the effect of isometric exercise in preventing the potential deleterious effects of immobilization. The organization of this unit was preceded by a feasibility study conducted in March of 1963.

During the year of 1963, two separate studies were conducted. The first study consisted of two periods: the first period aimed at evaluating the cardiovascular and metabolic effects of three days of bedrest in six healthy subjects; the

second period had the purpose of establishing whether or not a program of isometric exercises carried out during the three days of bedrest could offset some of the metabolic and cardiovascular responses observed in the first period. The second study also consisted of two periods: the first period intended to establish the extent of the metabolic and cardiovascular deconditioning of 14 days of bedrest on another group of 6 healthy subjects. Five of these subjects and a seventh individual who had not participated in the first study took part in a second period of 14 days of bedrest with isometric exercises.

The experimental design for each period of these two studies was complex and called for the serial measurement of numerous physiological and biochemical variables. In addition, there was abundant collection of descriptive data pertaining to each one of the subjects, their subjective reaction to the study, and a description of the circumstances surrounding each one of the tests. In order to process these data adequately and to obtain the maximum amount of useful information, it was necessary to set up a system for data processing which is described in this report.

The implementation of this system for data processing was simplified by utilizing some aspects of the general system for processing medical record information of the Texas Institute for Rehabilitation and Research. This system has been in operation for the last five years, and much experience has been gained on the use of source documents for collecting data at the bedside and at the laboratory.^{1,2,3,4} Experience previously acquired with different methods of coding data suggested the advisability of discarding coding techniques whenever possible and utilizing direct entries of numerical or alphabetic information.

THE MASTER FILE SYSTEM

An analysis of the different types of data to be collected in each one of the 13 subjects who participated in the two studies of the effects of bedrest indicated the need to set up a master file which would include the items described below. It is necessary to point out that at the termination of these two studies, not all the components of this file are in automatically retrievable form. It is intended, however, to complete the organization of the file in order to achieve full automation of the retrieval of data already collected and of data originating from future studies.

A. Subject's data

1. Identification data: These include the full name, birth date, sex, race, and date of admission to the Immobilization Study Unit. In the two immobilization studies described in this report, a standard Texas Institute for Rehabilitation and Research (TIRR) source document permitted entering this data on IBM punch cards. The format of this document is shown in the Appendix as Document #1. A second source document contained additional information such as address, telephone number, employer, etc. This information is variable and is considered irrelevant to the Master File. Document #2 of the Appendix shows the standard TIRR source document used for this purpose.
2. Past medical history: Items of interest in this category include prenatal history, neonatal history, growth and developmental data, immunization record, previous illnesses, record of past operations, and record of previous trauma. In order to enter these data on the healthy subjects who participated in the studies, a source document was designed for this purpose that could be filled out by each individual who was chosen as a candidate for a subject of the study. It is a simple task to transfer the data contained in this source document onto punch cards. Experience obtained by us and others in preparing source documents for entering past and current medical histories on punch cards was especially helpful in the preparation of this source document.^{5,6,7,8} The source document does not allow for entries of data pertaining to women subjects since one of the conditions stipulated in the experimental design was that all subjects should be men. This medical history document is presented as Document #3 of the Appendix.
3. Social and dietary habits: Data of this nature were also included in the special source document filled out by the candidates for the study (Document #3).
4. Family history: Pertinent data concerning the composition of the subject's family and the significant illnesses of hereditary and non-hereditary nature were also entered in the same source document (Document #3).

5. Psychological data: The data were obtained from an initial psychiatric interview with each individual who participated in the studies. The data reported included the subject's attitude toward the project, his psychological stability, and the psychiatrist's judgement of the capability of the subject to endure the experiment. No attempts were made to transfer this information onto punch cards.
6. Sociological data: This included descriptive data of a sociological nature according to a standard questionnaire utilized by the Social Service Departments of the Texas Institute for Rehabilitation and Research. This questionnaire is presented as Document #4 in the Appendix. In addition, there was a narrative report of the subject's sociological circumstances and an assessment of the Director of the Social Service Department regarding the subject's sociological behavior in the past and his motivation to participate in the experiments.
7. Circumstances of admission: In regular admission of patients to a hospital it is necessary to narrate as completely as possible the present illness that required hospitalization. The narration must be chronological and it must include time of onset, signs and symptoms, syndromes or diagnostic impairments, complications, medical and surgical treatments, diagnostic tests carried out, and the results of these tests. In the admission of healthy subjects for the purpose of the study of the effects of bedrest, there was no need to describe a present illness; but in order to fulfill the medical record requirements of the hospital, it was necessary to describe the reason for admission to the hospital and the highlights of the study to be conducted. This information was part of each subject's medical record.
8. Review of systems: It included information pertaining to the patient's usual manifestations of normal or abnormal function of the major systems of the body. Part of this information was included in the questionnaire filled out by each individual before his selection for the study.
9. Physical characteristics on admission: Height, weight, body surface area, and a full body picture with anterior-posterior and lateral view of the subject.

10. Physical examination: Data included pertained to the standard outline of a physical examination: general appearance, findings in the skin and lymph nodes, head, eyes, ears, nose, throat, neck, chest, heart, abdomen, genitalia, extremities, locomotor system, and neurological signs.
11. Clinical observations at the bedside: These included vital signs, intake and output, medications, physical data, signs and symptoms, and treatment procedures. In the first study, these data were entered in the standard source document utilized at the bedside for patients admitted to TIRR (Document #5). In the second study, two source documents were especially designed for the use in the Immobilization Study Unit (Document #6).
12. Physiological monitoring: Analog information pertaining to continuous or intermittent monitoring of the vital signs was part of the file also. The physiological variables that were recorded included the electrocardiogram, phonocardiogram, carotid and radial pressure pulse curves, arterial blood pressure by an electrospgmographic method, and pneumogram. There were special physiological tests which required special analog recordings. The purpose of the recordings was to register the cardiovascular response to passive tilt before and after each period of bedrest, the response to a Valsalva maneuver, and the monitoring of the electrocardiogram, phonocardiogram, and carotid pulse tracings during isometric exercises. The analog records were collected on magnetic tape and adequately coded for future retrieval.
13. Laboratory data: All the results of laboratory tests carried out on the subjects throughout each period of the two studies were entered into standard laboratory source documents in use at the Texas Institute for Rehabilitation and Research. The entries of each source document were transferred onto punch cards. The data entered on these documents included results of hematology tests, urinalyses, blood chemistries, urine chemistries, and fecal analyses. The standard source documents of the laboratory of the Texas Institute for Rehabilitation and Research were used (Documents #7 through #11).
14. Dietary entries: Additional data pertaining to chemical analysis of diets and description of each menu offered to the subjects throughout the two periods of each study were indicated in a special source document designed by the research dietitian who supervised the

dietary aspects of the study (Document #12). The subject's acceptance of the menu, his appetite, and the amounts of food ingested were also recorded.

B. Environmental factors

The Immobilization Study Ward was located in the basement. The room had artificial lighting, and it was fully air conditioned with controlled temperature and humidity. There were no sensible fluctuations in room temperature and humidity throughout the study, although actual measurements were not made. A study of the effects of bedrest in a controlled environment should include information pertaining to room temperature, humidity, and barometric pressure. In addition, throughout the two studies it became evident that there were other factors which may influence the reaction of the individuals to the study. The intensity of lighting and noise seemed of importance. There was a constant degree of activity in the ward with considerable noise in the daytime. The lights were turned off at 9 p.m. and turned on at 7 a.m.

C. Census

In an active hospital ward, it is necessary to keep adequate census of the bed occupancy and of daily admissions and discharges. Although the census in the Immobilization Study Unit was constant throughout the periods of the study, it was necessary to give a daily report of the number of subjects who were in the ward or who were on leave of absence in the intervals between periods of study.

D. Task assignments

The complexity of the experimental design required daily assignment of the tasks to each one of the members of the team in charge of the Immobilization Study. This was especially helpful in assigning jobs to the ancillary personnel as well as in keeping adequate schedule of the activities planned for each subject everyday. These tasks were indicated in a master protocol outlined each day by the physician in charge of the Immobilization Study Unit and by his research assistant. Document #13 is a sample of the protocol for one day of the second study. The scheduling of activities was not an automatic process, but its complexity and the time required for its preparation warrant a study of the possibilities of adapting current data processing techniques such as PERT or RAMPS to facilitate this function.

E. General administration

The data processing system which is in operation at the Texas Institute for Rehabilitation and Research permitted auditing the costs of operation of the Immobilization Study Unit. Entries of services rendered and charges for these services were made in the standard documents of the Institute.

F. Personnel activities

The routine system utilized at the Texas Institute for Rehabilitation and Research allowed for entries of the regular work hours of every employee of the Immobilization Study, his overtime work, leave of absence, and vacations. This was combined with an equitable merit point system designed to reward the employees with above average performance and aptitudes.

PROCESSING OF ANALOG DATA

The serial physiological monitoring and the special physiological tests performed on the subjects who participated in the two studies required the organization of a system for recording, retrieving, and analyzing physiological analog data. The system is depicted in the diagram of figure 1.

The physiological events (bioelectrical in nature or transformed to an electrical signal) were displayed in analog form in an eight beam oscilloscope and in a direct writing instrument (a Physiograph or an Offner Dynograph). Simultaneously this information was recorded on analog tape. Special coding signals were entered in the tape at pre-established times. This facilitated the search of pertinent data at the time of playback. The playback was done at the recording paper speed most suitable for the type of analysis intended. Each record was edited for recognition of important points and of noise. The records were then ready for semi-automatic analog to digital conversion. This was accomplished by means of a Telecordex or a Benson Lehner OSCAR Model E. The digitized data were entered onto punch cards and displayed simultaneously in a typewriter which permitted immediate error checking. The data of punch cards were further tabulated for data editing and correction and submitted to computer transformation and analysis. The data derived from computer analysis was presented in digital plot display and in tabular form for further editing, correction, and interpretation as well as for re-evaluation of mathematical and statistical models to be used. Also the data resulting from statistical analysis was displayed in a graphic or tabular form for final interpretation.

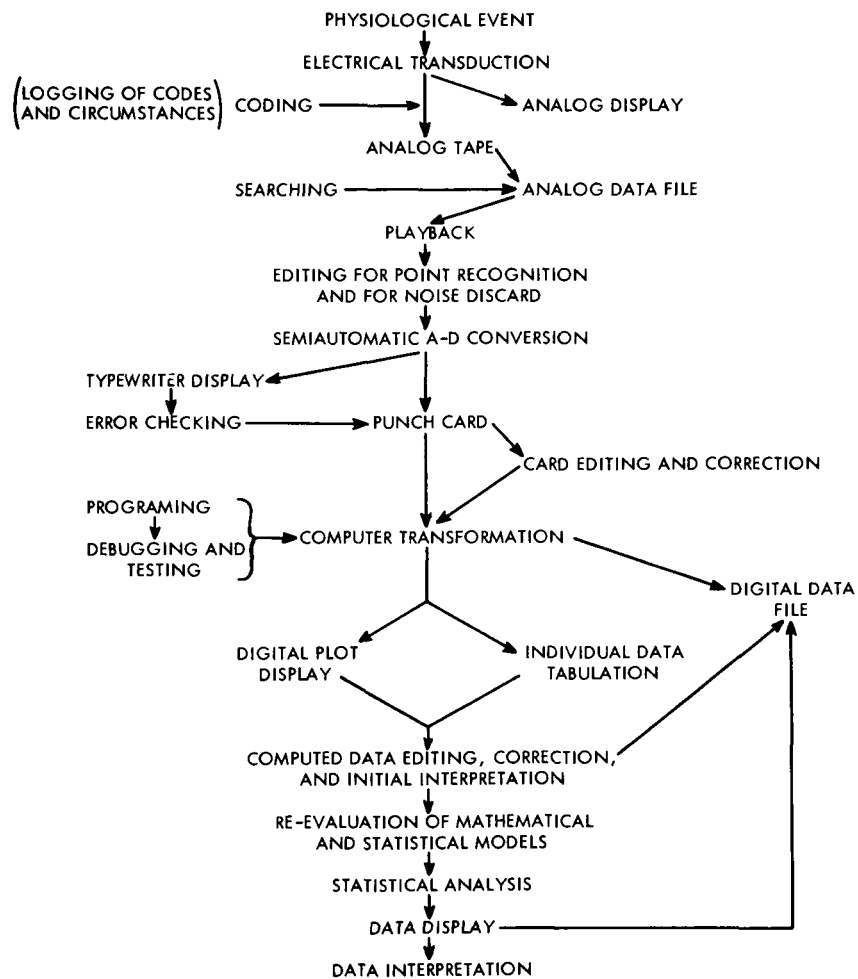


Figure 1. System for Analog Data Collection and Processing Developed in the Immobilization Study Unit of the Texas Institute for Rehabilitation and Research

It is clear that the system utilized in these two studies did not take full advantage of existing techniques and instruments for full automatization of the process. Under ideal circumstances the complete process could be achieved utilizing the system depicted in the diagram of figure 2. It must be understood, however, that the decision for not utilizing a system of this sort was not contingent upon difficulties for obtaining adequate instrumentation but rather on inherent limitation. A successful program for automatic analog to digital conversion must fulfill the following requirements:

1. Automatic search for points of interest.
2. Adequate noise discrimination.
3. Adequate file and storage capabilities.
4. Easy retrieval of the digitized information.

There are important problems arising from the need to fulfill each one of these requirements. The impossibility of finding a rapid solution of these problems precluded reliance on an automatic analog to digital conversion system for analyzing the data collected on the two studies within the expected time.

Problems inherent in the complete automatization of the computer processing must likewise fulfill the following requirements:

1. Adequate choice of analytic transformations.
2. Adequate choice of mathematical models for point recognition of the digitized information.
3. Adequate choice of mathematical models for a quantitative expression of the data.
4. Adequate choice of statistical models for tests of significance.
5. Efficient utilization of computer programming and debugging techniques.

Needless to say, there are major problems in the fulfillment of each one of these requirements. For this reason it was necessary to make provisions for adequate testing of the computer programs and for adequate digital and tabular display of the computed data to simplify their editing and correction before each major computation step.

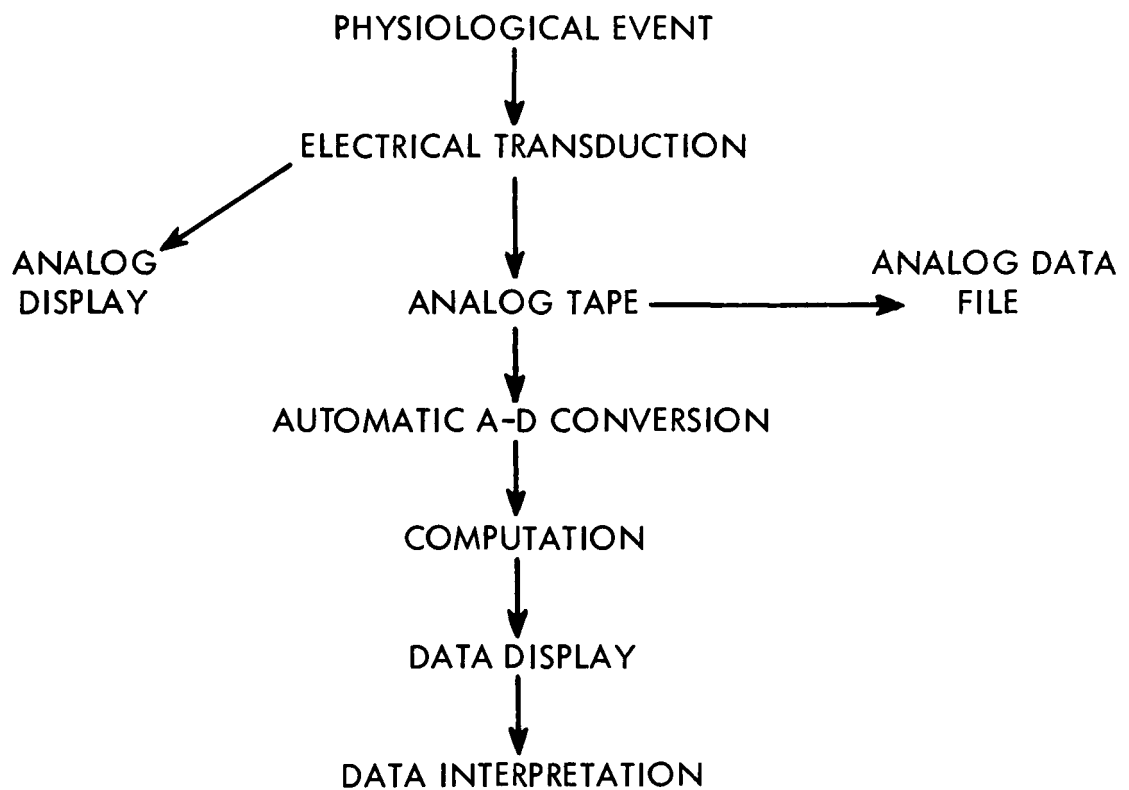


Figure 2. Ideal System for Collecting and Processing Analog Information

ANALOG RECORD EDITING

In order to process adequately each analog record obtained after playback of the magnetic tapes, it was necessary to proceed with the following steps:

1. Identification of the record according to the coding signal.
2. Labeling of the records in regard to the subject's name or number, date, time, and circumstances of test.
3. Discrimination of noise or other artifacts.
4. Selection of points to be recognized for semi-automatic analog to digital conversion. The recognition of these points was different depending on the type of records:
 - a. The records obtained at slow paper speed (0.2 centimeters per second) were those pertaining to bedside physiological monitoring and to passive tilt. In each one of these records two points for digitization were selected every half of a minute in each one of the channels of recording: pneumogram, intra-arterial blood pressure, arterial blood pressure by the Korotkoff method, and cardi tachogram.
 - b. Records obtained at fast paper speed (10 centimeters per second) were edited for recognition of the following points: the onset of the QRS complex of the electrocardiogram, the onset of the first and second sounds of the phonocardiogram, the onset of the ejection phase and the dicrotic notch of the carotid pulse tracing, and the onset of the ejection of the radial pulse tracing.
5. Establishment of the duration of records to be digitized:
 - a. The slow speed records pertaining to bedside monitoring were digitized for the total time of recording which on the average was two to five minutes. The slow speed records during the passive tilt were digitized for the total time of the test which was usually 20 minutes.
 - b. The fast speed records were digitized at each time of recording for a total length of 15 to 20 beats unless the RR interval of the electrocardiogram remained constant in which instance only 10 beats were edited for digitization.

SEMI-AUTOMATIC ANALOG TO DIGITAL CONVERSION

The conversion of the fast speed records from analog to digital form was made by means of a Telecordex. The slow speed records were digitized with a Benson Lehner OSCAR Model E. A Manual of Instructions was written for these tasks.

COMPUTER PROGRAMS

Several computer programs were written for the specific purpose of processing the data which were collected originally in alphanumeric form (numeric or alphabetic) or the data derived from the digitization of analog records.

A. Computer programs for measurements of cardiac dynamics

1. A computer program written by Mr. Floyd Rosenbaum of the Data Systems Development Branch of the Manned Spacecraft Center permitted processing of the digitized fast speed records of cardiac dynamics and permitted calculation of the total duration of the cardiac cycle beat-by-beat, the time of systole, the time of the isotonic phase of contraction, the time of the isometric phase of contraction, the pulse wave velocity, the predicted values of each one of these variables, and the ratios between observed and predicted values. This program yielded an output report as shown in figure 3. The program was executed with an IBM 7094 data processing system.
2. A separate program was written also by Mr. Floyd Rosenbaum to display a digital plotting of the variables computed with the first program. This allowed for adequate editing and subsequent modification of the program to discard automatically erroneous data which did not fulfill pre-established criteria for acceptance. An example of this plot is shown in figure 4.
3. An extension of the above computer programs permitted calculation of the average values of each variable at each period of recording with calculation of the averages and standard deviations for each variable. An example of the output is shown in figure 5.
4. A computer program written by Mr. Hadley Thompson of the Biomathematics Research Facility of Baylor University College of Medicine permitted calculation of the group averages and standard deviations for each time of testing and for each position of the individual (0°, 70°, etc.). An example of the output of this

*****THE DATE OF THIS REPORT FOR TILTS IS 7/6/64*****

82. 697. 420. L N E, A. C. 70011/POSIT 1/TIME 9070/DATE 90263 CALIB. 3762(.26582)

| OBSERVATION | A | B | C | D | E | F | | | | |
|-------------|-------|------|--------|-------|--------|-------|--------|---|-------|---|
| 1 | 164. | 278. | 717. | 1425. | 1524. | 3941. | | | | |
| T | 45.57 | S | 375.79 | I | 331.21 | X | 335.19 | M | 47.58 | V |
| | | | | | | | | | | |
| 2 | 200. | 370. | 706. | 1449. | 1558. | 3944. | | | | |
| T | 55.16 | S | 385.17 | I | 315.79 | X | 332.00 | M | 69.38 | V |
| | | | | | | | | | | |
| 3 | 227. | 418. | 736. | 1475. | 1565. | 3959. | | | | |
| T | 60.34 | S | 392.04 | I | 307.55 | X | 331.74 | M | 84.53 | V |
| | | | | | | | | | | |
| 4 | 197. | 381. | 709. | 1424. | 1532. | 4095. | | | | |
| T | 52.37 | S | 378.52 | I | 305.95 | X | 326.16 | M | 72.57 | V |
| | | | | | | | | | | |
| 5 | 194. | 384. | 695. | 1401. | 1533. | 4216. | | | | |
| T | 52.63 | S | 372.41 | I | 305.42 | X | 319.78 | M | 66.99 | V |
| | | | | | | | | | | |

Figure 3. Computer output of the values of cardiac dynamics in successive heart beats. A,B,C,D, and E are readings obtained from an analog to digital converter. T= interval between onset of QRS and onset of first heart sound, S= time of systole, I = time of isotonic phase, M = time of isometric phase, X = interval between onset of first and second heart sounds, V = pulse wave velocity, R = total duration of cardiac cycle, S' = predicted systole, I' = predicted isotonic phase, and M' = predicted isometric phase.

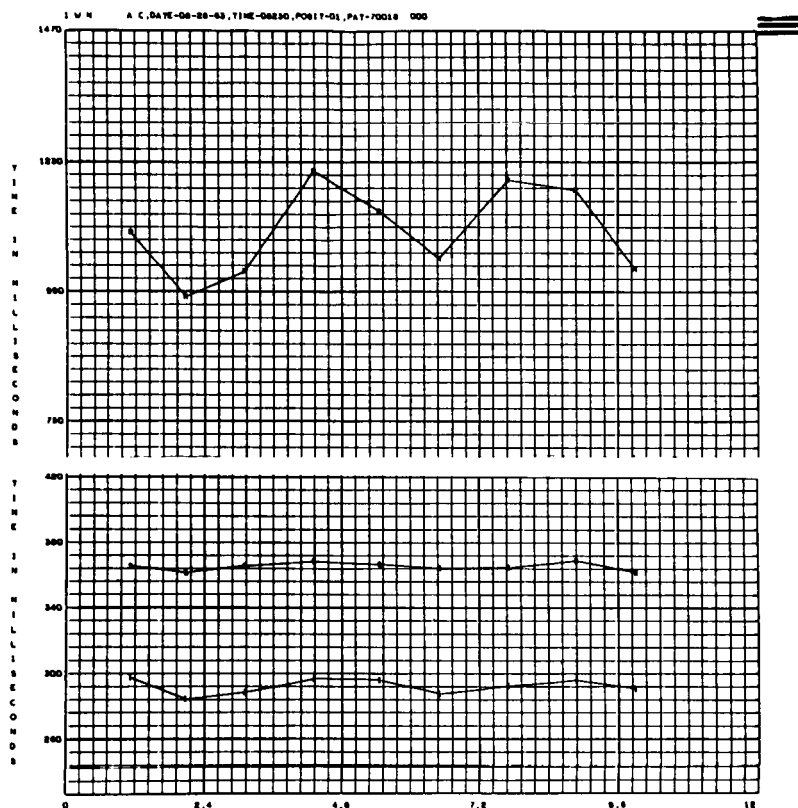


Figure 4. Graphic plots of total duration values of the cardiac cycle and its phases and successive heart beats.

*****THE DATE OF THIS REPORT FOR TILTS IS 7/6/64*****
 96. 673. 453. L : E, A. C. 70011/POSIT 3/TIME 10030/DATE 72263 CALIB. 37411 .26731)

| | | | | | | | | | |
|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| AVERAGE T | AVERAGE S | AVERAGE I | AVERAGE X | AVERAGE M | AVERAGE V | AVERAGE R | AVERAGE S' | AVERAGE I' | AVERAGE M' |
| 47.22 | 5.2.16 | 214.57 | 254.94 | 43.59 | 17.56 | 811.53 | 361.73 | 268.06 | 73.65 |
| STD.DEV. T | STD.DEV. S | STD.DEV. I | STD.DEV. X | STD.DEV. M | STD.DEV. V | STD.DEV. R | STD.DEV. S' | STD.DEV. I' | STD.DEV. M' |
| 3.70 | 6.41 | 8.14 | 5.35 | 6.41 | 7.66 | 148.14 | 5.66 | 2.78 | 2.28 |
| RATIO T/M | RATIO S/S' | RATIO I/I' | RATIO X/X' | RATIO M/M' | RATIO T/M | RATIO X/I | | | |
| 0.641175 | 0.835377 | 0.759787 | 0.885028 | 1.134945 | 0.364947 | 1.166373 | | | |
| | RANGE OF S | | RANGE OF I | | RANGE OF V | | RANGE OF R | | |
| | MIN | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| CALCULATED | 255.84 | 347.48 | 135.79 | 251.36 | 5.34 | 14.74 | 486.92 | 1136.15 | |
| ACTUAL | 297.94 | 309.66 | 208.75 | 253.54 | 7.52 | 11.75 | 372.40 | 900.96 | |

Figure 5. Computer output of average values and standard deviations of the cardiac dynamics in the steady state of the tilt position.

program is shown in figure 5. The programs were executed with an IBM 1620 computer and an IBM 1410 system.

5. A modification of library routine programs was used for statistical tests of significance of differences observed in the groups of individuals who were studied on various dates.

B. Computer programs for measurements of circulatory dynamics

1. A program written by Miss Martha Lewis of the Data Systems Development Branch of the Manned Spacecraft Center permitted processing of the digitized data of passive tilt tests and calculations of the systolic and diastolic arterial blood pressures, mean blood pressure, and pulse pressure both from intra-arterial pressure curves and from recordings obtained with an electrospphygmomanometer. An example of the output of this program is shown in figure 6. The program was executed with an IBM 7094 computer.
2. An extension of the above program permitted plotting in digital form the results obtained during passive tilt tests in each individual subject (figure 7).
3. Likewise, a program was written for calculation and plotting the group averages for each one of the variables indicated above (figure 8).
4. A program written by Mrs. Anne Christofferson and by Mr. Tom McBride of the Biomathematics Research Facility of Baylor University College of Medicine permitted calculation of the slopes of changes in heart rate and systolic and diastolic arterial blood pressures, mean blood pressure, and pulse pressure during passive tilt tests. The program was executed with an IBM 1620 computer (figure 9). Adaptation of available programs for statistical analysis permitted the calculation of averages and standard deviations of different parameters of the regression analysis carried out on each subject.
5. A program for final reporting of the regression analysis data in tabular form was written by Mr. Tom McBride of the Biomathematics Research Facility of Baylor University College of Medicine for the IBM 1410 system. An example of the output format is given in figure 10.
6. A special program was written by Mr. Hadley Thompson of the Biomathematics Research Facility of Baylor University College of Medicine for

| SUBJECT NO 70067 | | DATE 50663 | | HOUR 4001 | | PAGE 1 | | |
|------------------|-----------|------------|------------|-----------|-----|--------|-----|-----|
| TIME T1-T | CBP Y1 | ABPS Y2 | ABPD Y3 | HR Y4 | DY | YM | UY2 | YM2 |
| 2.04 | 156. | 0. | 0. | 87. | 0. | 9. | 74. | 87. |
| 2.51 | 62. | 0. | 0. | 87. | 0. | 0. | | |
| 1.73 | 128. | 130. | 77. | 90. | 53. | 95. | 64. | 85. |
| 1.62 | 64. | 130. | 74. | 87. | 56. | 93. | | |
| 0.61 | 140. | 140. | 77. | 86. | 63. | 98. | 81. | 86. |
| 0.48 | 59. | 134. | 78. | 78. | 56. | 97. | | |
| T1+T | | | | | | | | |
| 0.41 | 0. | 133. | 77. | 95. | 56. | 96. | 0. | 0. |
| 0.53 | 0. | 118. | 69. | 98. | 49. | 85. | | |
| 1.35 | 136. | 119. | 79. | 106. | 40. | 92. | 64. | 93. |
| 1.46 | 72. | 125. | 90. | 104. | 55. | 102. | | |
| 2.37 | 0. | 127. | 78. | 103. | 49. | 94. | 0. | 0. |
| 2.48 | 71. | 131. | 79. | 103. | 52. | 96. | | |
| D1+T | | | | | | | | |
| 0.06 | 0. | 128. | 82. | 101. | 46. | 97. | 0. | 0. |
| 0.20 | 0. | 143. | 87. | 91. | 56. | 106. | | |
| 1.08 | 138. | 0. | 0. | 85. | 0. | 0. | 75. | 84. |
| 1.21 | 63. | 0. | 0. | 87. | 0. | 0. | | |
| 2.07 | 136. | 132. | 81. | 89. | 51. | 98. | 76. | 85. |
| 2.20 | 60. | 133. | 76. | 81. | 57. | 95. | | |
| 3.07 | 145. | 146. | 86. | 79. | 60. | 106. | 70. | 98. |
| 3.19 | 75. | 144. | 87. | 92. | 57. | 106. | | |
| 4.03 | 0. | 134. | 77. | 91. | 57. | 96. | 0. | 0. |
| 4.15 | 67. | 135. | 79. | 80. | 56. | 98. | | |
| 5.05 | 138. | 133. | 78. | 75. | 55. | 96. | 79. | 85. |
| 5.19 | 59. | 129. | 78. | 82. | 51. | 95. | | |
| 6.00 | 138. | 124. | 92. | 73. | 32. | 104. | 71. | 91. |
| 6.12 | 67. | 0. | 0. | 74. | 0. | 0. | | |
| 7.02 | 145. | 137. | 81. | 81. | 56. | 106. | 83. | 90. |
| 7.16 | 62. | 126. | 75. | 71. | 51. | 92. | | |
| 7.99 | 132. | 119. | 77. | 81. | 42. | 91. | 75. | 82. |
| 8.12 | 57. | 124. | 74. | 75. | 50. | 91. | | |

Figure 6. Computer output of the average values of circulatory dynamics throughout the tilt tests. CBP indicates the reading of the blood pressure measured with an electrophygmomanometer. ABPS = arterial blood pressure systolic, ABPD = arterial blood pressure diastolic, HR = heart rate, DY = pulse pressure, and YM = mean blood pressure.

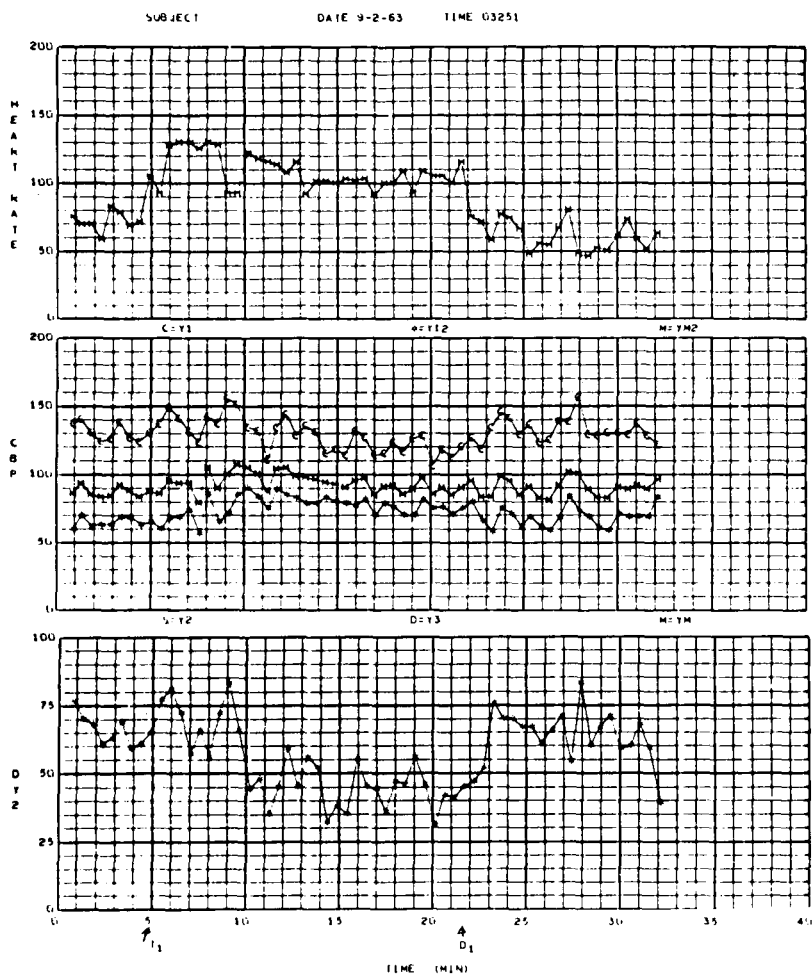


Figure 7. Plots of circulatory dynamic values during passive tilt tests on an individual subject.

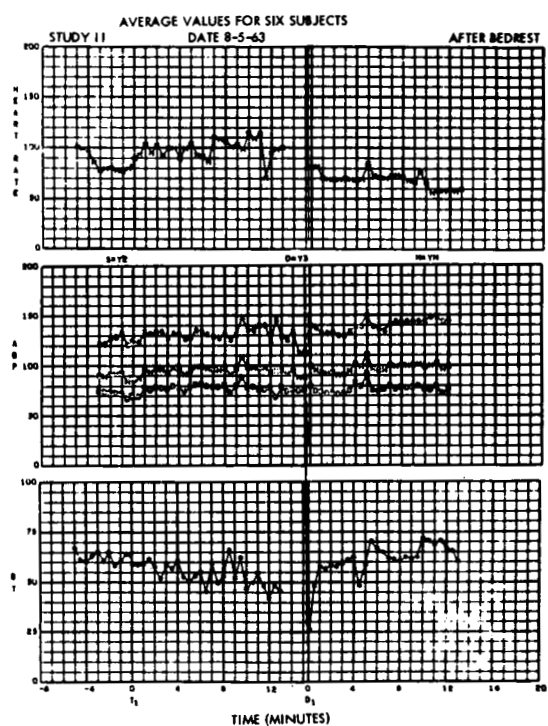
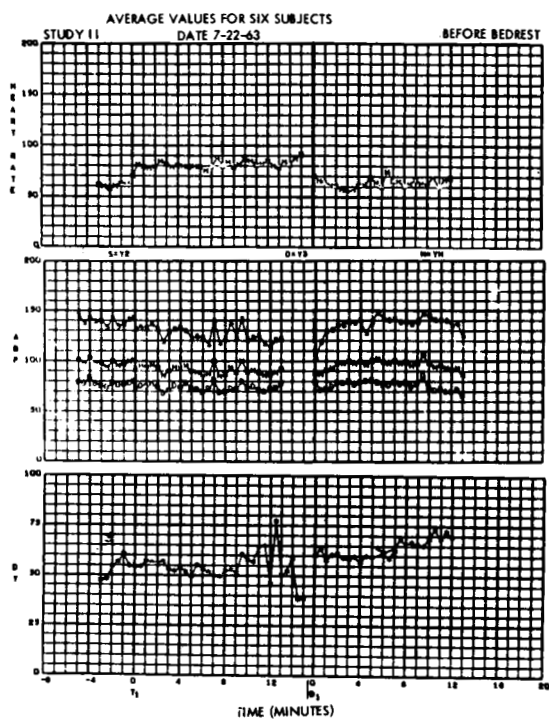


Figure 8. Graphic plots of circulatory dynamics for a group of six subjects throughout the tilt procedure.

| SUBJECT # | DATE | | | | | | | | |
|-------------|---------------------|-----------------------|--------------------|---------------------------------|----------------------|------------------|------------|--|---------------------------------|
| (100 16) | (8 5 63) | | | | | | | | |
| Appt. B.P. | 2.0461 22.5300 | 130.5654 1436.0000 | .8437 53.2644 | σ 6.7709 187794.0000 | 11.0000 2923.3600 | 1 1 16 1 1 16 | 5 ① 5 ① | | |
| Direct B.P. | 2.0481 22.5300 | 72.1272 800.0000 | .8437 53.2644 | 5.4422 58478.0000 | 11.0000 1614.4900 | 1 2 16 1 2 16 | 5 1 5 | | |
| Heart Rate | 1.7507 24.5100 | 74.1428 1018.0000 | .9664 55.0651 | 4.1111 77180.0000 | 14.0000 1781.0200 | 1 3 16 1 3 16 | 5 1 5 | | RESULTS AT 0° BEFORE TILT |
| Diff. B.P. | 2.0481 22.5300 | 57.8181 636.0000 | .8437 53.2644 | 3.2808 36880.0000 | 11.0000 1308.8700 | 1 4 16 1 4 16 | 5 1 5 | | |
| Mean B.P. | 2.0481 22.5300 | 91.2090 1011.0000 | .8437 53.2644 | 5.1464 93185.0000 | 11.0000 2050.0700 | 1 5 16 1 5 16 | 5 1 5 | | |
| Steps | 1.4220 2910.9472 | 131.2243 910.0626 | .8453 2410.4472 | 18.6377 91.0062 | 12.0000 F 31.9862 | 2 1 16 2 1 16 | 5 5 ② | | |
| Direct B.P. | 1.5145 458.2804 | 84.6713 374.2630 | .7905 458.2804 | 9.1243 41.5847 | 11.0000 11.0203 | 2 2 16 2 2 16 | 5 5 2 | | |
| Heart Rate | 1.4220 559.2267 | 86.6333 1438.4403 | .8453 559.2267 | 13.4761 143.8440 | 12.0000 3.8877 | 2 3 16 2 3 16 | 5 5 2 | | RESULTS DURING TILT POSITION |
| Diff. B.P. | 1.3145 284.7805 | 50.3636 103.7654 | .7905 284.7805 | 6.2333 11.5294 | 11.0000 24.7001 | 2 4 16 2 4 16 | 5 5 2 | | |
| Mean B.P. | 1.3145 742.0104 | 101.4895 369.6392 | .7905 742.0108 | 10.5434 41.0710 | 11.0000 18.0665 | 2 5 16 2 5 16 | 5 5 2 | | |
| Steps | 1.6160 24.2400 | 112.5331 1688.0000 | 1.0190 53.7090 | σ 22.7524 197332.0000 | 15.0000 3023.6800 | 1 1 16 1 1 16 | 5 ① 5 | | |
| Direct B.P. | 1.8430 23.9600 | 64.3076 836.0000 | .8901 53.6680 | 8.2298 54574.0000 | 13.0000 1619.0700 | 1 2 16 1 2 16 | 5 1 5 | | |
| Heart Rate | 1.6160 24.2400 | 55.4666 832.0000 | 1.0190 53.7090 | 5.7801 46616.0000 | 15.0000 1373.2700 | 1 3 16 1 3 16 | 5 1 5 | | RESULTS AT 0° AFTER TILT |
| Diff. B.P. | 1.8430 23.9600 | 55.3076 719.0000 | .8901 53.6680 | 6.7624 40315.0000 | 13.0000 1386.2000 | 1 4 16 1 4 16 | 5 1 5 | | |
| Mean B.P. | 1.8430 23.9600 | 82.7692 1076.0000 | .8901 53.6680 | 10.0842 90280.0000 | 13.0000 2080.2500 | 1 5 16 1 5 16 | 5 1 5 | | |

Figure 9. Computer output of the results of statistical analysis of circulatory dynamics during the passive tilt test.

SUBJECT # 70008

DATE 5/ 6/63

RESULTS IN SUPINE POSITION BEFORE TILT

| | | | |
|-------------|-------|--------|---|
| | MEAN | ST DEV | N |
| BP SYST | 123.7 | 4.4 | 7 |
| BP DIAST | 66.7 | 3.0 | 7 |
| H. R. | 69.3 | 3.9 | 8 |
| PULSE PRESS | 57.0 | 2.2 | 7 |
| MEAN PRESS | 85.5 | 3.4 | 7 |

RESULTS DURING TILT

| | | | | | | | | |
|-------------|-------|--------|-----------|--------|--------|--------|---|------|
| | MEAN | ST DEV | INTERCEPT | ST DEV | SLOPE | ST DEV | N | F |
| BP SYST | 125.7 | 21.4 | 163.9 | 5.8 | -21.38 | 3.4 | 4 | 37.9 |
| BP DIAST | 76.2 | 14.2 | 100.6 | 6.1 | -13.63 | 3.6 | 4 | 14.1 |
| H. R. | 86.1 | 3.3 | 83.9 | 3.4 | 1.40 | 1.7 | 6 | .6 |
| PULSE PRESS | 49.5 | 7.9 | 63.3 | 2.9 | -7.75 | 1.7 | 4 | 20.0 |
| MEAN PRESS | 93.0 | 16.4 | 121.7 | 5.9 | -16.07 | 3.5 | 4 | 20.6 |

RESULTS IN SUPINE POSITION AFTER TILT

| | | | |
|-------------|-------|--------|---|
| | MEAN | ST DEV | N |
| BP SYST | 121.7 | 4.2 | 4 |
| BP DIAST | 74.4 | 29.4 | 5 |
| H. R. | 58.7 | 2.4 | 7 |
| PULSE PRESS | 60.5 | 4.7 | 4 |
| MEAN PRESS | 81.2 | 1.5 | 4 |

RESULTS DURING TILT WITH PROVOCATIVE VALSALVA MANEUVER

| | | | | | | | | |
|-------------|-------|--------|-----------|--------|--------|--------|---|-----|
| | MEAN | ST DEV | INTERCEPT | ST DEV | SLOPE | ST DEV | N | F |
| BP SYST | 137.3 | 18.6 | 203.1 | 12.9 | -10.28 | 3.3 | 9 | 9.5 |
| BP DIAST | 84.7 | 11.4 | 123.3 | 8.4 | -6.02 | 2.1 | 9 | 7.8 |
| H. R. | 97.1 | 5.8 | 86.9 | 5.7 | 1.58 | 1.4 | 9 | 1.1 |
| PULSE PRESS | 52.5 | 8.6 | 79.7 | 6.8 | -4.25 | 1.7 | 9 | 5.8 |
| MEAN PRESS | 102.2 | 13.6 | 150.3 | 9.4 | -7.52 | 2.4 | 9 | 9.5 |

RESULTS IN SUPINE POSITION AFTER TILT

| | | | |
|-------------|-------|--------|---|
| | MEAN | ST DEV | N |
| BP SYST | 122.5 | 7.0 | 4 |
| BP DIAST | 66.2 | 6.8 | 4 |
| H. R. | 61.8 | 4.3 | 7 |
| PULSE PRESS | 56.2 | 7.6 | 4 |
| MEAN PRESS | 84.7 | 5.8 | 4 |

Figure 10. Edited computer output of the results of statistical analysis of circulatory dynamics during the passive tilt test.

plotting the vital signs on each subject throughout the periods of bedrest (figure 11). These plots were made with an IBM 1627 Plotter* connected with the IBM 1620 computer.

C. Measurements of circulatory dynamics during a Valsalva maneuver

1. A program was written by Mr. Tom McBride and Mr. Mike Alexander of the Biomathematics Research Facility of Baylor University College of Medicine to calculate the slopes of systolic and diastolic arterial blood pressure, mean blood pressure, pulse pressure, heart rate, stroke volume, cardiac output, and total peripheral resistance during different phases of the Valsalva maneuver. The program was executed with an IBM 1620 computer.
2. A special program was also written to calculate the best polynomial fit for the curve of the mean blood pressure during the phase of forced expiration. The program calculated the minimum amplitude and the time when this minimum amplitude occurred in each subject. The results obtained in each group of subjects studied on the same day were averaged. Likewise a program was adapted for calculation of the time constant of the return of the mean blood pressure to normal following the phase of overshoot upon release of the intrathoracic pressure.
3. The statistical analysis of the significance of the differences observed was carried out using available program library routines.

D. Ergometry test data

The data pertaining to changes in heart rate during the performance of an ergometry test were computed according to a program especially written for the purpose of plotting duration of the cardiac cycle beat-by-beat before, during, and after exercise. The program calculated also the time constant of the drop in heart rate at the time of recovery. This program had been developed by one of the authors (D.C.) and previously reported.⁹

*Manufactured by Calcomp under brand name IBM 1627.

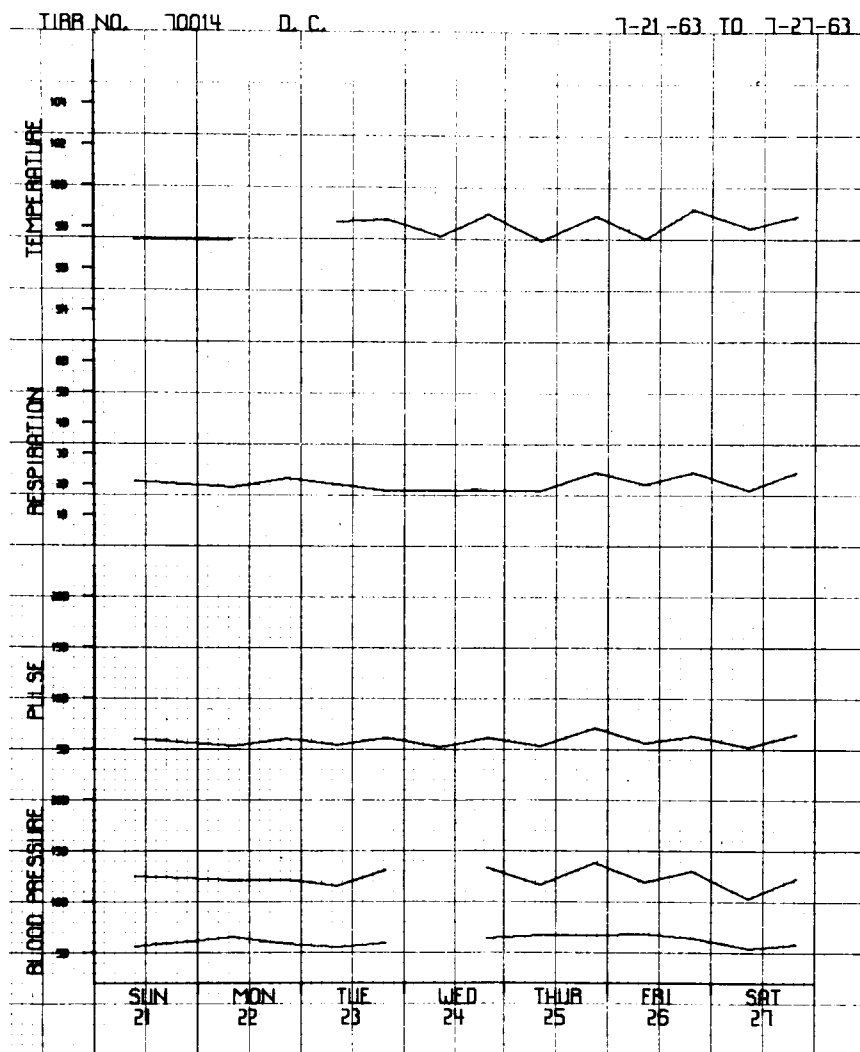


Figure 11. Plots of vital signs during a week of bedrest on an individual subject.

E. Laboratory data

1. The general programs used at the Texas Institute for Rehabilitation and Research for serial reporting of laboratory values were utilized in the two studies. Examples of the serial reports of laboratory data are presented in figures 12 and 13. Reports of this type were available for hematology, urinalysis, blood chemistry, and urine chemistry values.
2. A special program was developed by Mr. Tom Daniel of the Data Systems Development Branch of the Manned Spacecraft Center for computation of the statistical significance of the differences obtained in the laboratory values of blood corticoids in the first study.

CONCLUSION

The establishment of an Immobilization Study Unit for the purpose of evaluating the physiological effects of bedrest required the provision of a system for processing, storing, and retrieving the data collected in the course of the studies. A system was developed that permitted entries to punch cards of data pertaining to the subject's identification, past medical history, and physiological and sociological behavior during the study. Source documents of fixed format were used for collecting data at the bedside and in the laboratories. Analog to digital conversion was achieved by means of manually operated automatic digitizers. Several computer programs were written that permitted application of mathematical and statistical models to the analysis of the data collected.

HEMATOLOGY

| X-60 | | | | | | | | | | X-61 | | | | | | | | | |
|------|-----|----|------|-----|-------|-----|-------------------------|-------------------|-------------------|-------------|-------------|-----------|-------------|-----------|---------------|---------|-----|-----|-----|
| DATE | | | TIME | | HGB | HCT | RED BLOOD CELLS MILLION | ERYTHROCYTE INDEX | WHITE CELL SERIES | X-61 | | | | | | | | | |
| MO | DAY | YR | MO | DAY | CC | % | CC | CC | THOUSAND | NEUTROPHILS | LYMPHOCYTES | MONOCYTES | EOSINOPHILS | PLATELETS | BLEEDING TIME | CLAYTON | WET | WET | WET |
| 05 | 06 | 63 | 8 | 00 | 14.84 | 3 | | | 7.4 | 61 | 101 | 100 | 40 | 301 | | | | | |
| 05 | 07 | 63 | 8 | 00 | 15.04 | 2 | | | 10.4 | | | | | | | | | | |
| 05 | 08 | 63 | 8 | 00 | 15.04 | 4 | | | 10.4 | | | | | | | | | | |
| 05 | 02 | 63 | 8 | 00 | 13.14 | 1 | | | 14.4 | 72 | 31 | 80 | 7 | | A | | | | |
| 05 | 09 | 63 | 8 | 00 | 15.04 | 4 | | | 11.5 | | | | | | | | | | |
| 05 | 10 | 63 | 8 | 00 | 15.04 | 3 | | | 11.5 | | | | | | | | | | |
| 05 | 15 | 63 | 8 | 00 | 13.44 | 1 | | | 9.7 | | | | | | | | | | |
| 05 | 17 | 63 | 8 | 00 | 12.53 | 9 | | | 7.5 | | | | | | | | | | |
| 05 | 20 | 63 | 9 | 00 | 13.14 | 0 | | | 7.4 | | | | | | | | | | |
| 05 | 21 | 63 | 8 | 00 | 13.34 | 0 | | | 11.8 | | | | | | | | | | |
| 05 | 22 | 63 | 8 | 00 | 13.84 | 3 | | | 11.9 | | | | | | | | | | |
| 05 | 23 | 63 | 8 | 00 | 13.54 | 3 | | | 8.2 | | | | | | | | | | |
| 05 | 24 | 63 | 8 | 00 | 12.44 | 0 | | | 10.2 | | | | | | | | | | |

Figure 12. Computer generated report of the results of hematology tests on an individual subject.

URINE CHEMISTRY

| DATE | | | SPECIMEN BARCODE | TIME COLL | VOLUME OF SPECIMEN ml | PROTEIN mg | CHOLESTEROL mg | SODIUM mg | POTASSIUM mg | MAGNESIUM mg | CALCIUM mg | PHOSPHATE mg | IF ON CORT | GLUCOSE mg | CREATINE mg | CREATININE mg | CREATININE CLEARANCE ml/min | PSP | | |
|------|-----|----|---------------------|--------------|--------------------------------|---------------|-------------------|--------------|-----------------|-----------------|---------------|-----------------|---------------|---------------|----------------|------------------|-----------------------------------|-----|----|----|
| MO | DAY | YR | | | | | | | | | | | | | | | | 15 | 30 | 60 |
| 05 | 03 | 63 | 1200 | 2400 | 1400 | | 204 | 1 | 35 | | 7.0 | 24.9 | | | | | 1.80 | | | |
| 05 | 04 | 63 | 1200 | 2400 | 1720 | | | | | | 8.6 | 30.6 | | | | | 2.08 | | | |
| 05 | 05 | 63 | 1200 | 2400 | 903 | | | | | | 7.4 | 22.4 | | | | | 1.42 | | | |
| 05 | 06 | 63 | 1200 | 2400 | 1130 | | | | | | 6.5 | 37.3 | | | | | 1.60 | | | |
| 05 | 07 | 63 | 1200 | 2400 | 1390 | | 236 | 2 | 54 | | 7.4 | 38.0 | | | | | 1.63 | | | |
| 05 | 08 | 63 | 1200 | 2400 | 1300 | | | | | | 7.9 | 33.6 | | | | | 1.75 | | | |
| 05 | 09 | 63 | 1200 | 2400 | 1600 | | 173 | 1 | 61 | | 5.4 | 30.9 | | | | | 1.32 | | | |
| 05 | 10 | 63 | 1530 | 2400 | 880 | | 129 | 1 | 61 | | 5.4 | 26.9 | | | | | 1.57 | | | |
| 05 | 11 | 63 | 1200 | 2400 | 1300 | | | | | | 6.0 | 31.4 | | | | | 1.56 | | | |
| 05 | 17 | 63 | 1200 | 2400 | 2280 | | 324 | 3 | 47 | | 7.8 | 36.8 | | | | | 1.47 | | | |
| 05 | 18 | 63 | 1200 | 2400 | 1560 | | | | | | 6.1 | 27.7 | | | | | 1.64 | | | |
| 05 | 19 | 63 | 1200 | 2400 | 1050 | | | | | | 6.7 | 33.2 | | | | | 1.50 | | | |
| 05 | 20 | 63 | 1200 | 2400 | 940 | | | | | | 5.3 | 37.0 | | | | | 1.58 | | | |
| 05 | 21 | 63 | 1200 | 2400 | 2100 | | 290 | 3 | 57 | | 6.5 | 28.4 | | | | | 1.53 | | | |
| 05 | 22 | 63 | 1200 | 2400 | 1470 | | | | | | 6.6 | 30.8 | | | | | 1.56 | | | |

7CC06B:

B

Figure 13. Computer generated report of the results of urine chemistry tests on an individual subject.

REFERENCES

1. Spencer, W. A. and Vallbona, C.: Digitation of Clinical and Research Data in Serial Evaluation of Disease Processes. IRE Trans. Med. Electronics ME-7: 296, 1960.
2. Spencer, W. A. and Vallbona, C.: A Preliminary Report on the Use of Electronic Data Processing Technics in the Description and Evaluation of Disability. Arch. Phys. Med. 43: 22, 1962.
3. Vallbona, C.: Processing Medical Information at the Bedside. 4th IBM Medical Symposium: p. 405, 1962.
4. Vallbona, C.: An Automated Approach to the Individual Health Record. Proceedings of the New England Conference on Community Health Records Management: p. 71, 1962.
5. Schenthal, J. E., Sweeney, J. W., and Nettleton, W. J., Jr.: Clinical Application of Large-Scale Electronic Data Processing Apparatus. J. A. M.A. 173: 6, 1960.
6. Schwichtenberg, A. H. Flickinger, D. D., and Lovelace, W. R.: Development and Use of Medical Machine Record Cards in Astronaut Selection. U. S. Armed Forces Med. J. 10: 1324, 1959.
7. Aeromedical Evaluation for Space Pilots, USAF School of Aerospace Medicine, Aerospace Medical Division, (AFPS), SA Brooks Air Force Base, Texas, July, 1963.
8. Luykx, H. M.C.: Modernizing the Management of the Air Force Medical Service. J. A. M. A. 184: 102, 1963.
9. Cardus, D.: A Study of the Frequency of the Heart in the Early Phase of Recovery Following Muscular Exercise. 5th IBM Medical Symposium: 1963.

APPENDIX

Document #1 Basic identification information (TIRR document)
TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH

INPATIENT ☐
OUTPATIENT ☐

IN THE
TEXAS MEDICAL CENTER
HOUSTON, TEXAS

PATIENT NUMBER (1-5)

| | | | | | |
|---|--|---|-----------------|-----------------------|---------------|
| PATIENT'S NAME (LAST, FIRST & MIDDLE) (6-30) | | ADMISSION DATE | | DATE OF BIRTH (31-41) | |
| PATIENT'S ADDRESS (STREET & ZONE NUMBER) | | DATE OF ONSET (42-52) | SEX (53) M F | RACE (54) | RELIGION (55) |
| ACUTE TREATMENT (56) HOSPITAL CITY | | DATE FIRST SEEN S. W. P. R. R. C. (57-62) T. I. R. R. (63-66) | | | |
| PRE-ILLNESS HEIGHT _____ (69-70) WEIGHT _____ (71-73) | | POLIO VACCINE (74-75) TYPE _____ NO. OF INOCULATIONS | | | |
| | | BLOOD TYPE - Rh (76-77) (78) | | CARD 0 1 (79-80) | |

| ADMISSION DATE | DISCHARGE DATE | ADMISSION DATE | DISCHARGE DATE |
|----------------|----------------|----------------|----------------|
| 1. | | 18. | |
| 2. | | 19. | |
| 3. | | 20. | |
| 4. | | 21. | |
| 5. | | 22. | |
| 6. | | 23. | |
| 7. | | 24. | |
| 8. | | 25. | |
| 9. | | 26. | |
| 10. | | 27. | |
| 11. | | 28. | |
| 12. | | 29. | |
| 13. | | 30. | |
| 14. | | 31. | |
| 15. | | 32. | |
| 16. | | 33. | |
| 17. | | 34. | |

#2

BASIC INFORMATION
MEDICAL RECORD DEPARTMENT

TO BE INSERTED UNDER COPY #1
ON FIRST ADMISSION ONLY

INPATIENT ☐OUTPATIENT ☐

TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH

IN THE

TEXAS MEDICAL CENTER

HOUSTON, TEXAS

| | | | | | | | | |
|--|---------------------|--|---|--|--------------------|---|--------------------------------|--------------------------------------|
| PATIENT NUMBER (1-3) | | PATIENT'S NAME (LAST, FIRST & MIDDLE) (6-20) | | ADMISSION DATE (21-31) | TIME | DISCHARGE DATE (32-42) | TIME | DATE OF BIRTH |
| PATIENT'S ADDRESS (STREET & ZONE NUMBER) | | DATE OF ONSET | SEX (43) M F | RACE (44) | RELIGION | NO. OF ADMS (45-48) | | |
| CITY | COUNTY (47-49) | STATE (50-51) | PHONES DAY NIGHT | MARITAL STATUS SINGLE MAR. SEP. WID. DIV. | | AGE (52-54) YEARS MONTHS | | |
| ATTENDING PHYSICIAN | ADMITTING DIAGNOSIS | | PROGRAM AT ADMISSION | | RESP. STATUS (71) | ISOLATION <input type="checkbox"/> YES <input type="checkbox"/> NO | | |
| SOURCE OF REFERRAL (72) <input type="checkbox"/> 1. PRIV. PHY. <input type="checkbox"/> 3. O.P.D. <input type="checkbox"/> 2. HOSPITAL <input type="checkbox"/> 4. OTHER | | NAME OF REFERRING PHYSICIAN | | ADDRESS | | PHONES OFFICE HOME | | |
| SPONSOR | | ADDRESS | | | | | | |
| HEAD OF HOUSEHOLD EMPLOYED BY | | OCCUPATION OF PATIENT | | IS PATIENT VET.? | | V. A. CLAIM NUMBER | | |
| SPOUSE OR NEAREST KIN | | ADDRESS | | PHONE: HOME OFFICE | | RELATIONSHIP | | |
| NOTIFY IN EMERGENCY | | ADDRESS | | PHONE: HOME OFFICE | | RELATIONSHIP | | |
| LOCAL TEMPORARY ADDRESS OF RELATIVE | | PHONE | | RELATIONSHIP | | | | |
| NAME OF INSURANCE COMPANY | | NAME OF INSURANCE COMPANY | | | | | | |
| NAME OF INSURED & POLICY NUMBER | | NAME OF INSURED & POLICY NUMBER | | | | | | |
| ALLERGIES | | | | | | | | |
| ATTENDING PHYSICIAN (55-57) | | | PROGRAM (58-60) | | | DATE OF CHANGE | | DAYS STAY OF PHYSICIAN OR ON PROGRAM |
| ON ADMISSION | | | | | | | | (61-63) |
| TRANSFER TO | | | | | | | | |
| TRANSFER TO | | | | | | | | |
| TRANSFER TO | | | | | | | | |
| TRANSFER TO | | | | | | | | |
| TRANSFER TO | | | | | | | | |
| RESULTS (64) | | | TYPE OF DEATH (65) <input type="checkbox"/> < 48 HRS. <input type="checkbox"/> > 48 HRS. | | CONSULTATIONS (66) | | TOTAL DAYS | |
| INSTITUTIONAL INFECTIONS (67) | | PATIENT STATUS WHEN DIAGNOSIS IS MADE (68) | | DISCHARGED TO (69) | | | RESP. STATUS AT DISCHARGE (70) | |
| CIRCULATION: A - INPATIENT ALL SHEETS B - REGULAR OUTPATIENT COPIES 1, 4, 5, 6, 7, 8, 9, 11 C - RESTRICTIVE OUTPATIENT COPIES 1, 5, 6, 7 | | | | CARD 0 2 (79-80) | | | | |
| | | | | SIGNATURE M.D. | | | | |

#1 FACE SHEET

*CODE ON REVERSE SIDE

TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH
in the
Texas Medical CenterIDENTIFICATION DATASubject Number:(not to be filled out by applicant) Name: _____
(Last name first)Date of Birth: Religion: _____
Mo. Day YearPlace of Birth: _____
(City and State)

(Please use proper code numbers in answering questions)

Sex: ___ (1. Male, 2. Female) Race: ___ (1. White, 2. Negro, 3. Latin American, 4. Yellow, 5. Other) Current Height: ___ (in inches) Usual Weight: ___ (in pounds) Marital Status: ___ (1. Single, 2. Married, 3. Divorced, 4. Widower) Current Occupation: ___ (1. Student, 2. Employed, 3. Unemployed, 4. Other) If employed: 1. Current Occupation: _____
2. Employer: _____If student: 1. What is major course? _____
2. Where attending? _____
3. Working toward what degree? _____
4. Have you ever been on scholastic probation? _____
5. Have you ever been expelled from school? _____
If yes, give cause: _____Immobilization Study
Subject Candidate Questionnaire

EDUCATION AND WORK EXPERIENCE

List below names of schools (begin with High School) you have attended.

| Dates | | | | Name | Location | Degree Obtained |
|-------|------|-----|------|------|----------|-----------------|
| From | | To | | | | |
| Mo. | Year | Mo. | Year | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

List below in chronological order any jobs you have held in the past and the length of your employment.

| Dates | | | | Place of Employment | Job Description |
|-------|------|-----|------|---------------------|-----------------|
| From | | To | | | |
| Mo. | Year | Mo. | Year | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Immobilization Study
Subject Candidate Questionnaire

PAST MEDICAL HISTORY

DEVELOPMENTAL HISTORY

(Please use proper code in answering questions)

To the following questions answer: 1. Don't know, 2. No, 3. Yes

| | |
|--|--|
| Were you a full term baby? | |
| Were you a premature baby | |
| Did you have any abnormalities at birth? | |
| Were you breast fed? | |
| Were you bottle fed? | |

As a child did you have any problem with the following:

| | |
|-----------------------|--|
| Feeding or nursing | |
| Bed Wetting | |
| Thumb sucking | |
| Stammer or Stuttering | |
| Temper Tantrums | |
| Sleepwalking | |
| Nightmares | |
| Eating | |
| Nervousness | |
| Convulsions | |
| Asthma | |
| Allergies | |
| Hay Fever | |
| Chocolate | |
| Penicillin | |
| Sulfa | |
| Other Drugs | |
| Plants | |
| Dust | |
| Insects | |

Indicate APPROXIMATE age in months of the following: (if known).

| | | |
|-------------------------|--|--|
| Sitting up | | |
| Walking | | |
| First Distinctive Words | | |

Immobilization Study
Subject Candidate Questionnaire

ILLNESSES

The following is a list of frequent illnesses in childhood or adulthood. Please indicate whether or not you have had any of them. If you do not know, please indicate.

| Disease | Don't know | No | Yes | Age | Where hospitalized if known. | Complications if any. |
|------------------|------------|----|-----|-----|------------------------------|-----------------------|
| Measles | | | | | | |
| German measles | | | | | | |
| Chicken Pox | | | | | | |
| Whooping Cough | | | | | | |
| Mumps | | | | | | |
| Diphtheria | | | | | | |
| Frequent Colds | | | | | | |
| Scarlet Fever | | | | | | |
| Typhoid Fever | | | | | | |
| Asthma | | | | | | |
| Rheumatic Fever | | | | | | |
| Pneumonia | | | | | | |
| Bronchopneumonia | | | | | | |
| Abscessed Ears | | | | | | |

List all other illnesses that you have had.

| Year | Age | Disease or Complaint | Were you hospitalized? If so, where? | Recovery complete? If not, complications. |
|------|-----|----------------------|---|--|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Venereal Diseases: Syphilis, Gonorrhea or other (please specify).

| Year | Age | Disease | Were you treated? | Were you given full clearance? |
|------|-----|---------|-------------------|--------------------------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Immobilization Study
Subject Candidate Questionnaire

Allergies: Are you at the present time allergic to any one of the following?
If you have allergies to agents not indicated below, please list them in the blank spaces provided. Indicate: 1. Don't know, 2. No, 3. Yes

| | | |
|-------------|--|--|
| Hay Fever | | |
| Chocolate | | |
| Penicillin | | |
| Sulfa | | |
| Other Drugs | | |
| Plants | | |
| Dust | | |
| Insects | | |
| Other: | | |
| | | |
| | | |
| | | |
| | | |
| | | |

OPERATIONS

List all known operations since birth, even minor ones such as circumcision.
Be as precise as possible in giving dates.

| Date | | | Type of Operation | Name of Physician | Where hospitalized | Remarks |
|------|-----|------|-------------------|-------------------|--------------------|---------|
| Mo. | Day | Year | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

INJURIES OR ACCIDENTS

List all injuries or accidents requiring the services of a physician. Be as precise as possible in giving dates.

| Date | | | Type | Name of Physician | Hospital | Remarks |
|------|-----|------|------|-------------------|----------|---------|
| Mo. | Day | Year | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Immobilization Study
Subject Candidate Questionnaire,

IMMUNIZATION RECORD

Use Code: 1. Don't know, 2. No, 3. Yes

| | | |
|---|--|--|
| Small Pox | | |
| Last vaccination against Small Pox was in year: | | |
| Diphtheria | | |
| Last vaccination against Diphtheria was in year: | | |
| Whooping Cough | | |
| Last vaccination against Whooping Cough was in year: | | |
| Tetanus | | |
| Last vaccination against Tetanus was in year: | | |
| Typhoid Fever | | |
| Last vaccination against Typhoid Fever was in year: | | |
| Yellow Fever | | |
| Last vaccination against Yellow Fever was in year: | | |
| Armed Forces Routine Vaccinations | | |
| Last time I received Armed Forces Routine Vaccinations was in year: | | |
| Poliomyelitis Salk Vaccine | | |
| Number of injections to date | | |
| Last injection was received in year: | | |
| Poliomyelitis Sabin Type I | | |
| Last time I received this vaccine was in year: | | |
| Poliomyelitis Sabin Type II | | |
| Last time I received this vaccine was in year: | | |
| Poliomyelitis Sabin Type III | | |
| Last time I received this vaccine was in year: | | |
| Any other vaccines you have received: Give name and year. | | |
| | | |
| | | |
| | | |
| | | |
| Have you received the following immunizing agents? Use Code: 1. Don't know, 2. No, 3. Yes. Indicate when you last received the serum by year. | | |
| Serum against Tetanus | | |
| What year | | |
| Serum against Diphtheria | | |
| What year | | |
| Gamma Globulin | | |
| What year | | |
| Any other: Give type and year. | | |
| | | |
| | | |
| | | |

Immobilization Study
Subject Candidate Questionnaire

FAMILY HISTORY

LIVING RELATIVES

| | | |
|---|----------------|--|
| Check if you are adopted son | | |
| Relation | Age at present | |
| Paternal Grandfather | | |
| Paternal Grandmother | | |
| Maternal Grandfather | | |
| Maternal Grandmother | | |
| Father | | |
| Mother | | |
| Brother | | |
| Brother | | |
| Brother | | |
| Brother | | |
| Brother | | |
| Brother | | |
| Sister | | |
| Sister | | |
| Sister | | |
| Sister | | |
| Sister | | |
| Sister | | |
| Sister | | |
| Spouse: | | |
| List your living children: (indicate if any of the children are adopted) | | |
| Son | | |
| Son | | |
| Son | | |
| Son | | |
| Daughter | | |
| Daughter | | |
| Daughter | | |
| Daughter | | |

Immobilization Study
Subject Candidate Questionnaire

FAMILY HISTORY

DECEASED RELATIVES

| Relation | Cause of Death | Age at Death | |
|----------------------|----------------|--------------|--|
| Paternal Grandfather | | | |
| Paternal Grandmother | | | |
| Maternal Grandfather | | | |
| Maternal Grandmother | | | |
| Father | | | |
| Mother | | | |
| Brother | | | |
| Brother | | | |
| Brother | | | |
| Brother | | | |
| Brother | | | |
| Brother | | | |
| Sister | | | |
| Sister | | | |
| Sister | | | |
| Sister | | | |
| Sister | | | |
| Sister | | | |
| Spouse: | | | |
| Children: | | | |
| Son | | | |
| Son | | | |
| Son | | | |
| Son | | | |
| Daughter | | | |
| Daughter | | | |
| Daughter | | | |
| Daughter | | | |

Immobilization Study
Subject Candidate Questionnaire

DISEASES IN FAMILY

| Disease | Don't know | No | Yes | Relatives affected |
|------------------------|------------|----|-----|--------------------|
| Diabetes | | | | |
| Cancer | | | | |
| Tuberculosis | | | | |
| Asthma | | | | |
| Epilepsy | | | | |
| Stroke | | | | |
| Mental Disorder | | | | |
| Nervous System disease | | | | |
| High Blood Pressure | | | | |
| Heart Disease | | | | |
| Migraine | | | | |
| Leukemia | | | | |
| Arthritis | | | | |
| Hay Fever | | | | |
| Paralysis (any form) | | | | |
| Other: | | | | |
| | | | | |
| | | | | |
| | | | | |

MILITARY SERVICE

If you have served in any branch of the Armed Forces, please answer the following questions.

| |
|--|
| Branch of service |
| Total number of months in service _____ Classification _____ |
| If you received dishonorable discharge, give cause: _____ |
| If you have retained reserve status, give last date of duty tour and location: _____ |
| List any honors or decorations you received while in service: _____ |
| |
| |

Immobilization Study
Subject Candidate Questionnaire

SOCIAL HISTORY

SMOKING

Use code: 1. Don't know, 2. No, 3. Yes, in answering the following questions.

| | | |
|---|--|--|
| Have you ever smoked? | | |
| Do you now smoke? | | |
| If yes to above question: | | |
| How many cigarettes per day do you smoke? | | |
| How many cigars per day do you smoke? | | |
| How many pipes per day do you smoke? | | |
| Do you use tobacco in any other form? | | |
| If yes, explain: | | |
| | | |

DRINKING

| | | |
|--|--|--|
| Have you ever drunk alcoholic beverages? | | |
| Do you now drink alcoholic beverages? | | |
| If you drink socially put a check mark in the box. | | |
| If you drink regularly, indicate the average number of drinks per day you take. | | |
| If you drink beer regularly, indicate the average number of beers you drink per day. | | |
| Please indicate your average daily consumption of the following: | | |
| Coffee (indicate the number of cups) | | |
| Hot tea (indicate the number of cups) | | |
| Cold tea (indicate the number of glasses) | | |
| Milk (indicate the number of glasses) | | |
| Coke (indicate the number of bottles) | | |

DIET

| | |
|----------------------------------|--|
| Describe your average breakfast: | |
| | |
| Describe your average lunch: | |
| | |
| Describe your average dinner: | |
| | |

Immobilization Study
Subject Candidate Questionnaire

SOCIAL HISTORY

DIET (continued) Use code: 1. Don't know, 2. No, 3. Yes

Have you ever dieted to lose weight? ☐

Have you ever taken medication to help you lose weight? ☐

If yes, give name of medication and dosage: _____

Are you at the present time taking medication for weight loss? ☐

EXERCISE

Give an estimate of the amount of exercise that you do in one week.

Please use this rating. 1. Minimal amount, 2. Moderate amount, ☐

3. A lot. _____

SPORTS

Use code: 1. Don't know, 2. No, 3. Yes

Have you ever been engaged in active sports? ☐

Are you now engaged in active sports? ☐

Please indicate the sports in which you have participated in the past and those in which you now participate.

| |
|--|
| |
| |
| |
| |

DRIVING

Use code: 1. Don't know, 2. No, 3. Yes

Have you been or are you now a regular operator of any of the following vehicles?

Car _____ ☐

Plane _____ ☐

Motorcycle _____ ☐

Bus or Public vehicle _____ ☐

Power boat _____ ☐

Sail boat _____ ☐

Other: _____ ☐

| |
|--|
| |
|--|

Immobilization Study
Subject Candidate Questionnaire

RESIDENCES

Please list below the names of the places where you have resided.
Give name of town only:

| Dates | | Name of town |
|-------|----|--------------|
| From | To | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Have you ever lived or visited in another country?

Use code: 1. Don't know, 2. No, 3. Yes:

If yes, give the name of the country and the length of your stay.

| |
|--|
| |
| |
| |
| |
| |

CONTAGIOUS CONTACTS

Please indicate with check in box if you have had any recent contagious contact with any of the following illnesses.

| | |
|------------------|--|
| measles | |
| chicken pox | |
| mumps | |
| meningitis | |
| tuberculosis | |
| typhoid fever | |
| poliomyelitis | |
| flu | |
| venereal disease | |
| hepatitis | |
| other: | |
| | |

CURRENT MEDICATIONS

If you are currently taking any medications (including aspirin) please indicate the following:

| Name of medicine | Amount | Frequency | Only occasionally |
|------------------|--------|-----------|-------------------|
| | | | |
| | | | |

Immobilization Study, Subject Candidate Questionnaire

SYSTEMS REVIEW

Please put a check mark (✓) in box if you have or have had any of the following.

HEAD

| | |
|--|--|
| Frequent headaches | |
| Frequent pain in face | |
| Pounding headaches or flushing of the face | |
| Migraine | |
| Intermittent swelling of the face not related to injury or infection | |

EYES

| | |
|---|--|
| Need to use glasses | |
| Contact lenses | |
| Farsightedness | |
| Nearsightedness | |
| Astigmatism | |
| Crossing of the eyes | |
| Blind spots | |
| Partial blindness of your visual field | |
| Difficulty in seeing at night | |
| Color Blindness | |
| Yellowish discoloration of the eyes | |
| Swelling of the eyelids in the mornings | |
| Pain in the eye | |
| Burning or itching of the eyes | |
| Pressure feeling in the eyes | |
| Double Vision | |
| Lump in the eyelid | |
| Injury to the eye ball | |
| Operation in the eye | |
| Intolerance to bright light | |

EARS

| | |
|-------------------------------------|--|
| Severe earache | |
| Draining in ears | |
| Ruptured ear drum | |
| Temporary or permanent hearing loss | |
| Ringing or buzzing in the ears | |
| Dizziness | |
| Air sickness | |
| Motion sickness | |
| Mastoiditis | |
| Otitis media | |

Immobilization Study
Subject Candidate Questionnaire

SYSTEMS REVIEW

EARS (continued)

| | |
|---------------------------------------|--|
| Trouble with your ears after swimming | |
| Fungus infection of the ears | |
| Extreme sensitivity to noise | |
| Injury to the ear | |
| Surgery to the ears | |

NOSE

| | |
|--------------------------------------|--|
| Frequent head colds | |
| Frequent sneezing | |
| Excessive nasal discharge | |
| Frequent nose bleeding | |
| Post Nasal drip | |
| Trouble breathing through the nose | |
| Deviation of the septum | |
| Fracture of the nose | |
| Surgery of the nose | |
| Acute sinus infection | |
| Chronic sinus infection | |
| Difficulty in smelling various odors | |
| Stuffy nose | |
| Allergic reaction to: | |
| Plants | |
| Dust | |
| Insects | |
| Other | |
| If yes to above, specify: | |
| | |
| | |

MOUTH

| | |
|--|--|
| Frequent sores inside of the mouth | |
| Fever blisters around the mouth or throat | |
| Frequent bleeding or tender gums | |
| Complete or partial dental plates | |
| Pyorrhea or infection of the gums | |
| Large number of cavities in your teeth | |
| Excessive bleeding following extraction of tooth | |
| Frequent toothache | |
| Intolerance to cold in contact with the teeth | |
| Intolerance to heat in contact with the teeth | |
| Dental work in the last six months | |
| Foul breath or halitosis | |
| Excessive dryness of the mouth | |
| Abnormality in sense of taste | |

Immobilization Study
Subject Candidate Questionnaire

SYSTEMS REVIEW

THROAT

| | |
|---|--|
| Difficulty in pronouncing words | |
| Frequent soreness in throat | |
| Hoarseness | |
| Recent and permanent change in your voice | |
| Stuttering | |
| Difficulty in swallowing | |

SKIN

| | |
|--|--|
| Frequent pimples or boils | |
| Acne or pimples on face | |
| Easy bruising | |
| Excessive sweating | |
| Ulcers on any part of your skin | |
| Discoloration of the skin | |
| Any moles | |
| Skin rashes | |
| Dryness of the skin | |
| Greasy coating of the skin | |
| Giant hives (urticaria) | |
| Excessive loss of hair | |
| Changing in the texture of the hair | |
| Excessive softness of the hair (seborrhea) | |

NECK

| | |
|---------------------------------------|--|
| Deformities of the neck | |
| Enlargement of the glands of the neck | |
| Tumors or masses in the neck | |
| Pain or stiffness in the neck | |
| Whiplash accident | |
| Wryneck | |
| Visible pulsating veins | |

SPINE

| | |
|------------------------|--|
| Slipped disc | |
| Low back pain | |
| Back injury | |
| Deformity of the spine | |
| Fracture of the spine | |

Immobilization Study
Subject Candidate Questionnaire

SYSTEMS REVIEW

RESPIRATORY

| | |
|--|--|
| Chronic or recurrent cough | |
| Coughing up of blood or pus | |
| Pain in chest | |
| Shortness of breath while lying down | |
| Shortness of breath while sitting up | |
| Asthmatic attacks | |
| Chest wheezes | |
| Collapsed lung | |
| Shingles of the chest wall (small vesicles or herpes zoster) | |
| Pain in the chest on deep breathing | |
| Pleural inflammation | |

CARDIOVASCULAR

| | |
|---|--|
| Disturbances in the blood supply to the heart (coronaries) | |
| Bluish discoloration of the lips, skin, fingers or toes(cyanosis) | |
| Congenital defect in the heart | |
| Heart murmur | |
| Enlargement of the heart | |
| Rheumatic fever affecting the heart | |
| Anemia | |
| High blood pressure | |
| Low blood pressure | |
| Dizzy spells related to change in posture | |
| Feeling of light headedness upon arising in the morning | |
| Hardening of the arteries | |
| Loss of consciousness from head injury | |
| Loss of consciousness while receiving an injection | |
| Have you ever fainted | |
| Heat prostration | |
| Sudden changes in the speed of the heart beat(too fast or too slow) | |
| Sensation of skipping a beat (extrasystoles) | |
| Chest pain during exercise | |
| Occasional dizzy spells | |
| Easy tiring with slight effort | |

DIGESTIVE

| | |
|--|--|
| Stomach distention | |
| Discomfort in stomach during night | |
| Burning sensation in stomach that is relieved by milk, alkalines or food | |
| Frequent indigestion | |
| Tendency to vomit | |

Immobilization Study

Subject Candidate Questionnaire

SYSTEMS REVIEW

DIGESTIVE (continued)

| | |
|--|--|
| Tendency to belch | |
| Severe pains in the stomach | |
| Intermittent pain in the abdomen | |
| Need to get up in the morning hours to eat or drink to relieve pain in the stomach | |
| Peptic ulcer | |
| Gallbladder disease | |
| Gallstones | |
| Liver disease | |
| Jaundice | |
| Cirrhosis | |
| Hepatitis | |
| Diseases of the pancreas | |
| Swelling in the abdomen | |
| Bowel distention | |
| Irregularity of the bowels | |
| Frequent constipation | |
| Frequent diarrhea | |
| Thin stools | |
| Clay stools | |
| Staining of the stools | |
| Black or tarry bowel movements | |
| Hemorrhoids | |
| Itching around rectum | |
| Rectal polyps | |
| Rectal fistula or abscess | |
| Unusual amount of hiccoughs | |
| Pain in rectum | |
| Pain during bowel movements | |
| Lack of control of the bowels | |
| Large, bulky, foamy or foul smelling stools | |

ENDOCRINE

| | |
|--|--|
| Fluctuations in body weight independent of dieting | |
| Excessive amount of fat in the body (obesity) | |
| Excessive weight loss | |
| Craving for food | |
| Excessive thirst or craving for water | |
| Excessive amount of urinary output | |
| Diabetes | |
| Need to take insulin | |
| Fullness of the neck (goiter) | |
| Need to take thyroid medication | |
| Dry and scaly skin | |

Immobilization Study
Subject Candidate Questionnaire

SYSTEMS REVIEW

ENDOCRINE (continued)

| | |
|---|--|
| Coarse hair | |
| Protusion of the eyeballs and marked jitters | |
| Retention of water in the skin and swelling of some parts of body | |
| Excessive sweating | |
| Unusual amount of hair (hirsutism) | |
| Precocious appearance of hair on the body or around the genitalia | |
| Loss of calcium from the bones | |
| Tendency to have spontaneous fractures of the bones | |

URINARY

| | |
|--|--|
| Difficulty in passing urine | |
| Need to have a catheter in bladder for any reason | |
| Infection of the kidneys | |
| Infection of the bladder | |
| Pus in the urine | |
| Blood in the urine | |
| Sugar in the urine | |
| Albumin or protein in the urine | |
| Dark brown urine | |
| Kidney stones | |
| Shooting pains in the back radiating down to the testicles | |
| Need to get up at night to pass urine | |
| Frequency in urination | |
| Burning sensation during urination | |
| Trouble starting or stopping the stream during urination | |
| Inability to control your bladder | |

GENITALIA (to be filled out by men only)

| | |
|--|--|
| Circumcision | |
| Swelling or enlargement of either testicle | |
| Injury to the testicles | |
| Itching around the genitalia | |
| Urethral discharge | |
| Hernia | |
| Swelling of the scrotum | |
| Sexual difficulties | |
| Sterility | |
| Infection of the prostate gland | |
| Enlargement of the prostate gland | |
| Pain in your penis | |
| Injury to your penis | |

Immobilization Study
Subject Candidate Questionnaire

SYSTEMS REVIEW

EXTREMITIES

| | |
|---|--|
| Numbness or tingling of the feet | |
| Numbness or tingling of the hands | |
| Pain in the calves of the legs while walking | |
| Shooting pains down the leg | |
| Swelling or enlargement of the veins in the legs (varicose veins) | |
| Swelling of the feet or ankles | |
| Swelling of the hands | |
| Blood clots in the legs | |
| Stiffness of the joints | |
| Dislocation of any joint | |
| Pain in any joint | |
| Swelling of any joint | |
| Injury or fractures of any joint or bones | |

MUSCLES

| | |
|---|--|
| A feeling of weakness in some of your muscles | |
| Twitching of the muscles | |
| Loss of muscle mass (atrophy) | |
| Increase in the size of the muscles (hypertrophy) | |
| Weakness after exercise | |
| Low grip strength | |
| Difficulty in loosing your grip after grasping an object with the hands | |
| Muscle tenderness | |
| Inflammation of muscles | |

CENTRAL NERVOUS SYSTEM

| | |
|--|--|
| Coma or unconsciousness | |
| Convulsions | |
| Difficulty in falling asleep (insommnia) | |
| Tendency to fall asleep | |
| Tendency to be excited | |
| Weakness or paralysis in any muscle group | |
| Brisk or jerky reflexes | |
| Decreased reflexes | |
| Sustained tremors | |
| Decreased sensation to touch in any part of the body | |
| Decreased sensation to heat or cold | |
| Need to have a spinal tap | |
| Injury that has rendered you unconscious | |
| Encephalitis | |
| Meningitis | |
| Electroshock treatments | |

Immobilization Study
Subject Candidate Questionnaire

SYSTEMS REVIEW

CENTRAL NERVOUS SYSTEM (continued)

| | |
|---|--------------------------|
| Surgery to the brain or spinal cord _____ | <input type="checkbox"/> |
| Injury to surgery to nerve _____ | <input type="checkbox"/> |
| Transient or permanent loss of memory _____ | <input type="checkbox"/> |
| Difficulty in identifying objects _____ | <input type="checkbox"/> |
| Staggering gait _____ | <input type="checkbox"/> |

GENERAL

| | |
|--|--------------------------|
| Have you ever had any blood transfusions reactions _____ | <input type="checkbox"/> |
| Have you ever been exposed to any of the following: | |
| Toxic substances (be specific) _____ | <input type="checkbox"/> |
| X-ray radiation _____ | <input type="checkbox"/> |
| Poisons (be specific) _____ | <input type="checkbox"/> |
| Chemicals (be specific) _____ | <input type="checkbox"/> |
| Other toxics: _____ | <input type="checkbox"/> |
| | |
| | |
| | |
| | |

REMARKS: (not to be filled in by subject candidate)

Social Service Section I - Immobilization Study

NAME _____ No. _____ Date _____

I Motivation for Participation

- A. Primary Reason
- B. Secondary Reason
- C. How did you first learn of Study?
- D. How long did it take for you to reach decision to participate?
- E. Did you discuss the advisability of your participating with other persons prior to reaching decision? No; yes
- F. If yes, who was consulted?
- G. What was your family's reaction to your participation in Study?
- H. Do you have any regrets about agreeing to participate? No; yes
- I. If yes, what are bases for regrets?

II Acquaintance With Other Subjects

- A. Did you know any of the other five men before the Study began? No; yes
- B. If yes, names of subjects known and how associated.

III History of Origin

- A. Birth Date _____
- B. Birth Place _____
- C. Number of Siblings _____
- D. Birth Order _____
- E. Reared by natural parents; adoptive parents; foster parents; other =
(specify)
- F. Where reared:
- G. Birth place of father:
- H. Birth place of mother:
- I. Was any language other than or instead of English spoken in parental home?
No; yes
- J. If yes, specify language _____
- K. Educational level attained by subject _____
- L. Educational level attained by father _____
- M. Educational level attained by mother _____
- N. Educational level attained by siblings _____
- O. Age at which subject left parental home _____

IV Marital History; Progeny

- A. Current marital status: single; married; separated; divorced; widowed
- B. Number of marriages _____
- C. Date of present marriage _____
- D. Date of first marriage (if married more than once) _____
- E. How was previous marriage terminated _____; date _____
- F. Number of previous marriages of spouse _____
- G. Number of natural children _____
- H. Number of adopted or foster children _____
- I. Do all children live with subject? Yes; No
- J. If NO, where and with whom do children live?

V Residence and Household Membership

- A. How long have you resided in town of your legal residence? _____
- B. How long have you lived at present street address? _____
- C. How many times have you moved in past 10 years? _____
- D. Give relationship and ages of persons residing in same household with you: _____
- E. Type of dwelling occupied: Single unit house; duplex; apartment; rooming house; dormitory; fraternity house; trailer house; other (specify) _____
- F. Living quarters are owned, rented, provided rent free

VI Health

- A. Do you consider yourself physically fit? Yes; No
- B. If no, what are your health problems: _____
- C. Do you have a regular family physician? Yes; No
- D. How often do you have a general physical examination? _____
- E. Are there health problems in other members of your immediate family? No; Yes
- F. If yes, explain _____
- G. Do you consider yourself light sleeper; heavy sleeper?
- H. Are there any particular foods that you feel that you are unable to eat? No; Yes
- I. If yes, explain _____
- J. Smoking habits _____
- K. Drinking habits _____

VII Occupational Status

- A. Present occupation _____
- B. Length of time employed by present employer _____
- C. If present occupation is not usual occupation, state the latter _____
- D. If currently unemployed (how long has unemployment existed _____
- E. If currently unemployed what was last occupation _____
- F. At what age did you begin working? _____
- G. What are chances of promotion in present position?

- H. How many times have you changed jobs since entering employment market? _____
- I. How many of these job terminations were initiated by your employer _____
- J. If present classification is that of student what vocation are you preparing for _____
- K. Explain types of part-time jobs held while on student status.

Immobilization Study (continued)

Page 3

VII: Economic Status

- A. Source of present income
- B. Amount of income - \$ _____
- C. Usual income, if current income not representative - \$ _____
- D. If married, is your wife employed? No; yes; N.A.
- E. If yes, occupation and salary of wife - _____; \$ _____
- F. Do you contribute toward the support of anyone outside your household? No; Yes
- G. If yes, relationship and amount of contribution - _____ \$ _____
- H. Do you have dependents other than wife and children living in home with you?
No; yes
- I. If yes, relationship of dependents _____
- J. Do your monthly expenses exceed your income? Never; occasionally; frequently;
regularly
- K. At present do you consider your debts to be minimal; moderate; excessive
- L. Do you have a savings account? Yes; no
- M. Do you have life insurance? Yes; no; Hospitalization Insurance - Yes; no
- N. How often do you usually buy a new car? _____
- O. Have your bills ever been turned over to an agency for collection? Yes; no

IX Military Service

- A. Have you served in any branch of Armed Forces? Yes; no
 - 1) If answer is no; what is your present classification with Selective Service System _____
 - 2) If answer is yes; give branch of Service and dates
_____ to _____
- B. Was your period of service well-timed (that is in terms of personal plans educational and vocational goals)? Yes; no
- C. Explain basis for above answer _____

X Relationships

- A. While growing up how did you get along with
 - 1. Father
 - 2. Mother
 - 3. Siblings
- B. Describe status of current relationship with
 - 1. Father
 - 2. Mother
 - 3. Siblings
 - 4. Father-in-law
 - 5. Mother-in-law
 - 6. Wife's siblings

C. Have you had misunderstandings or disagreements with -

| | never | occasionally | frequently |
|-----------------|-------|--------------|------------|
| Neighbor | | | |
| Landlord | | | |
| Co-workers | | | |
| Employers | | | |
| Friends | | | |
| Classmates | | | |
| Creditors | | | |
| Other (specify) | | | |

X) Family Life

- A. Who has major responsibility for discipline of children?
- B. Does management of children seldom or frequently cause disagreements in the home?
- C. Who in your family is primarily responsible for handling finances and planning expenditures?
- D. Do disagreements arise regarding management of finances? NEVER; occasionally; frequently
- E. What is your religious affiliation?
- F. What is your wife's religious affiliation?
- G. Do differences in religious philosophy cause disagreements between you? Never; occasionally; regularly
- H. How frequently do you attend church? Never; occasionally; regularly
- I. What kinds of activities do you and your family engage in together as a group?
- J. Do you consider your and your wife's sexual adjustment as ideal; acceptable; unsatisfactory?
- K. What is the chief cause of friction in your marriage?
- L. Have either you, your wife or both ever sought guidance or consultation regarding marital problems from the following:
- | | | |
|--------------------|-----|----|
| Marriage counselor | Yes | No |
| Social worker | Yes | No |
| Minister | Yes | No |
| Psychologist | Yes | No |
| Family physician | Yes | No |
| Psychiatrist | Yes | No |
| Friend | Yes | No |
| Other (specify) | | |
- M. In your opinion is your marriage very happy; moderately happy; unsatisfactory?

XII Leisure Time Activities

A. Sedentary

1. Read newspaper
2. Other reading interests (specify)
3. Watching TV
4. Games, cards, Bridge, Chess Dominoes
5. Movies; plays
6. Play musical instrument
7. Listen to music - records, radio, concerts
8. Crafts
9. Other (specify)

| Regu- larly | Occas- ionally | Never |
|----------------|-------------------|-------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

B. Active

1. Horseback riding
2. Swimming
3. Fishing
4. Boating
5. Water skiing
6. Camping
7. Hunting
8. Skating
9. Tennis
10. Football
11. Basketball
12. Baseball
13. Auto racing
14. Pool
14. Golf
16. Bowling
17. Archery
18. Ice skating

| Regu- larly | Occas- ionally | Never |
|----------------|-------------------|-------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

XIII Unusual Behavior

- A. How many times have you received tickets for traffic violations?
- B. What was the nature of these violations?
- C. Has your drivers license ever been suspended or cancelled? No; yes
- D. If yes, why was it suspended or cancelled?
- E. Have you ever been arrested for any offense other than traffic violations?
No; yes
- F. If yes, describe circumstances:

Immobilization Study (continued)

XIII Unusual Behavior (continued)

- G. In elementary school, high school or college, were you ever disciplined (for reasons other than scholastic) by suspension, probation or expulsion? No; yes

- H. If yes, give reasons and grade level at time of incidence

- I. In your opinion what is the wisest act or decision of your life?

- J. In your opinion what is the most foolish act or decision of your life?

XIV Community Responsibility of Participation

A. Membership in Organizations

1. Fraternal
 - a)
 - b)
2. Religious
 - a)
 - b)
3. Social
 - a)
 - b)
 - c)
3. Political
 - a)
 - b)
4. Professional
 - a)
 - b)
5. Labor Union
 - a)
 - b)
6. College Fraternity
7. Chamber of Commerce
8. Special Interest Clubs
 - a)
 - b)
 - c)

None. Active. Inactive

| | | |
|--|--|--|
| | | |
|--|--|--|

- B. Did you pay your poll tax this year? Yes; no
C. Politically do you consider yourself conservative; liberal; no opinion
D. Do you assume some responsibility with fund raising drives put on by churches, charitable organizations or special health programs? Never; occasionally; often

Immobilization Study (continued)

XV Subject's Understanding of Self

- A. What do you consider as your greatest strengths or assets?
- B. What are your major deficits, liabilities or inadequacies?
- C. What, in general, are your goals or desires in life in respect to your own personal ambitions, your hopes for your family and vocational aspirations (global view)?
- D. Are the possibilities good that you may achieve these goals? Yes;
uncertain; no
- E. If negative or doubtful, what seem to be the factors that may interfere with realization of goals?
- F. What is your greatest concern in respect to your total life situation?
- G. What is your chief concern in relation to your participation in this study?

XVI Other General Comments Made by Subject

XVII Social Worker's Assessment of Subject's Attitude Toward this Interview

XVIII Initial Overall Evaluation of Subject

Social Service - Section II - Immobilization Study

NAME _____ No. _____ Date _____

- I What has been your contact with your family since reporting to this project?
- II If your family is aware of the routine of the study, what is their present reaction to your participation?
- III Has anything happened within your family or "on the outside" since project began that causes you to be worried or concerned? No; yes
- IV If yes, describe situation.
- V Is your concern - slight moderate excessive
- VI Interviewer's evaluation of subject's above concern - slight moderate excessive
- VII How do you feel about your participation in project at this point?
- VIII Have you been tempted at any time to leave? No; yes
- IX If so, why?
- X What caused you to reconsider?
- XI What has been the most difficult part for you?
- XII What part do you like best?
- XIII What part do you like least?
- XIV Has boredom been a problem? never occasionally frequently
- XV Which one of the men seems to be the leader of the group?
- XVI How do you usually spend your time during the periods that you are free to leave the building?

Section II (continued)

- XVII With which of the men do you feel most congenial or friendly?
- XVIII With which of the men do you feel least congenial?
- XIX How do you feel that the group gets along together as a whole?
- XX In general, how have you been treated by the personnel of the project?
- XXI In your opinion is the financial compensation adequate? yes no
- XXII Would you be willing to repeat this experience? yes no
- XXIII Why?
- XXIV Do you have any suggestions that might make the subject's role easier in future projects?
- XXV Have you been sleeping well? yes no
- XXVI Have you had any difficulty with the meals?
- XXVII Do you think you will be interested in continuing an acquaintance with any of the five men when project is over? No; yes
- XXVIII If so, who?
- XXIX Classify your feelings in general during the time that you have been in the study:
- A. Completely relaxed and at ease at all times.
 - B. Relaxed and at ease the majority of time.
 - C. Mixed feelings (50 - 50) part time relaxed; part time tense and apprehensive.
 - D. Tense and apprehensive majority of time.
 - E. Tense and apprehensive at all times.
- XXX What do you plan to do as soon as you go out on pass for several days?
- XXXI Other Comments Made by Subject

Interviewer's Evaluation of Subject at this Stage

Social Service Section III - Immobilization Study

NAME _____ No. _____ Date _____

- I How do you feel about the project now that it is over?
- II In your opinion is the financial compensation adequate? Yes; no
- III Would you recommend this type of study to a friend of yours? Yes; no
- IV Why?
- V How did you spend your time when you were on pass for several days?
- VI Has anything happened within your family or "on the outside" during latter part of study to cause you concern or worry? No; yes
- VII If yes, describe the situation
- VIII Do you feel that your worry or concern in respect to above has been - slight; moderate; excessive?
- IX Interviewer's evaluation of subjects concern - slight; moderate; excessive
- X Has there been any change in your feelings re. [] with whom initially you felt most congenial? No; yes
- XI If yes, explain
- XII Has your attitude changed regarding the person in the group [] for whom you care the least? No; yes
- XIII If yes, explain.
- XIV Which of the subjects seems to have been the leader of the group the last half of the study?
- XV Do you anticipate seeing any member of the group at any future time?
- XVI What part of the study held the most interest or attraction for you?
- XVII After having become familiar with the routine, was it - easier; harder no different, to return for last part?
- XVIII Has the group spirit or morale changed during the course of the project? No; yes
- XIX If yes, explain

Immobilization Study (continued)

XX Do you have any recommendations to make regarding future studies? No; yes

XXI If yes, these are:

XXII Do you feel that you were able to perform adequately in all tests and other routines required of you? Yes; no.

XXIII If no, in which situations do you think you could have produced better results or have cooperated more fully?

XXIV To what do you attribute your failure to produce at your maximum potential?

XXV Classify your feelings in general during your participation in the study:

- A. Completely relaxed and at ease at all times.
- B. Relaxed and at ease the majority of the time.
- C. Mixed feelings (50 - 50) part time relaxed; part time tense and apprehensive.
- D. Tense and apprehensive throughout entire study.

XXVI Would you be willing to repeat this experience? Yes; no

XXVII Reason for above answer

XXVIII Other Comments Made by Subject

Final Overall Evaluation by Interviewer

TEXAS INSTITUTE FOR REHABILITATION & RESEARCH
IN THE TEXAS MEDICAL CENTER

| CARD NUMBER <input type="text"/> DATE <input type="text"/> | | PROCEDURE TREATMENT | | MD CONTACT VISIT PERFORM | CLINICAL OBSERVATIONS | | INTAKE | | OUTPUT | |
|--|------|---------------------|----------------------------|-----------------------------------|-----------------------|----------------|--------|-------|--------|-------|
| | | SIDE | PROC. R A SITE DATE L P | | SIDE | STONS R A SITE | LIQUID | ROUTE | LIQUID | ROUTE |
| HM | TEMP | PULSE | RESP RATE | BLOOD PRESS | POSITION | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |
| HM | O | R | | | | | | | | |

| MEDICATIONS | | 11-7 | 7-3 | 3-11 | MEDICATIONS | | 11-7 | 7-3 | 3-11 |
|-------------|--|------|-----|------|-------------|--|------|-----|------|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| PARENT | | 11-7 | 7-3 | 3-11 |
|---------------|--|------|-----|------|
| O in WATER | | | | |
| SND IN/MS | | | | |
| SND IN/MS | | | | |
| SND IN/MS | | | | |
| BLD | | | | |
| TOTALS | | | | |
| 24 HOUR TOTAL | | | | |

| SPECIAL PROCEDURES | | 11-7 | 7-3 | 3-11 |
|--------------------|---------------|------|-----|------|
| CAC | 24 HOUR URINE | | | |
| HBCT | BLOOD | | | |
| BLOOD CHEM | CLINICAL | | | |
| TYPE-X MATCH | ECG | | | |
| ART CHEM | ECG | | | |
| VINAL | ECG | | | |
| STOOL | ECG | | | |
| TRIGL | ECG | | | |
| CONTOURS | ECG | | | |
| BLD | ECG | | | |
| PAP | ECG | | | |
| UNALYSIS | ECG | | | |
| WGT | ECG | | | |
| LAB | ECG | | | |

Immobilization Study

RECORD SHEET NO. _____

SUBJECT NAME _____

DATE _____

SUBJECT NO

[illegible]

Enter same information below as recorded on sample label (from pooled 24 hour sample)

| Subject No. | Time | Date | ml sent Utah | ml sent Wash | ml sent Mack | ml sent MSC | ml for TIRR |
|-------------|------|------|-----------------|-----------------|-----------------|----------------|----------------|
| | | | | | | | |
| | | | | | | | |

Feces Information

| Subject No. | Weight (gms) | Comments |
|-------------|--------------|----------|
| | | |

IS 5/1/63

Texas Institute for Rehabilitation and Research

IMMOBILIZATION STUDY

[illegible]

| | | |
|----|-----|------|
| | | |
| Mo | Day | Year |

Subjects name and number

TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH
Houston 25, Texas

Requested by _____ M.D. Clinic _____ Station _____

Specimen obtained: Date: _____ 6-11 Time _____ 17-21 AM PM

Clinical Diagnoses: _____

For CBC check here _____ CBC (includes Hb, Hct, WBC differential) 1304 05

Otherwise check tests needed.

RED CELL SERIES

(x in 60)

27-30 Hemoglobin (Hb, Hgb) _____ g/100 ml blood..... 1301 02

31-32 Hematocrit (Hct).... %..... 1302 02

33-36 Erythrocyte Count (RBC) _____ million per cu. mm..... 1303 03

Erythrocyte characteristics (all) to 4+):

37 Hypochromia.....

38 Anisocytosis.....

39 Poikilocytosis.....

40 Polychromasia.....

41 Sick cells.....

42 Target cells.....

43 Reticulocytes.....

44 Basophilic stippling

45 Other.....

(see below for Sick cell preparation and Reticulocyte count)

Erythrocyte indices:

1305 08

46-47 Mean corpuscular hemoglobin (MCH) (27-31 picograms) _____

48-49 Mean corpuscular volume (MCV) (89-92 cubic microns) _____

50-51 Mean corpuscular Hb concentration (MCHC) (32-36%) _____

52-55 Reticulocyte count (0.5 to 1.5%) _____ % of RBC's

1306 03

WHITE CELL SERIES

56-60 White cell count (WBC) _____ thousand per cu. mm. 1307 02

Differential count..... 1308 02

Neutrophils

61-62 Segmented _____

63-64 Band forms _____

65-66 Lymphocytes ... _____

67-68 Monocytes _____

69-70 Eosinophiles... _____

71-72 Basophiles..... _____

73-74 Immature forms _____

75-76 Sedimentation rate, Wintrobe, corrected _____ mm/60 min. 1310 05

77 Platelets, visual estimate (Wright's stain) (see below for Platelet count)

D _____ Decreased A _____ Adequate I _____ Increased

(x in 61)

27-30 Bleeding time min. 1311 02

31-34 Coagulation time, Lee-White _____ min. 1312 03

35-39 Clot retraction..... min. _____ %..... 1314 03

40-42 Eosinophile count..... per. cu. mm. 1320 03

43-44 Eosinophile smear..... % 1321 03

45-52 Erythrocyte fragility _____ % NaCl initial, _____ % NaCl complete 1322 05

53 L.E. cell preparation 0 _____ negative, 1 _____ positive 1313 07

54-56 Platelet count..... thousands per cu. mm. 1309 03

57-58 Sick cell preparation _____ % of RBC's 1315 05

Date analyzed _____ Analyzed by _____

Code [1] [3] (79-80)

HEMATOLOGY SOURCE DOCUMENT

TIRR - LAB - #1

Rev. 4/62

Patient's name and number (1-5)

MICROSCOPIC RESULTS

(x in 61)

Method (28)

C__Centrifuged U__Uncentrifuged D__Diluted

WBC/HPF (average 3 fields)..... 29-30
Over 100..... 31(x)

WBC clumped (32)

O__Negative 1__Positive

RBC/HPF (average 3 fields)..... 33-34
Over 100..... 35(x)

Epithelial cells

Predominant cells (36)

C__Caudate S__Squamous R__Round

Quantity of predominant cell per HPF..... 37-38
Over 100 39(x)

Renal cells (40)

O__Absent 1__Present 2__Slow fatty degeneration

Casts per HPF

| | | |
|------------------------|--|-------|
| Finely granular..... | | 41-42 |
| Coarsely granular..... | | 43-44 |
| Waxy..... | | 45-46 |
| Hyaline..... | | 47-48 |
| WBC..... | | 49-50 |
| RBC..... | | 51-52 |
| Epithelial..... | | 53-54 |
| Cylindroids..... | | 55-56 |

(x in 62)

Fungi or yeast (28)

0__None 1__Few 2__Moderate 3__Many

Bacteria

Rods (29)

0__None 1__Few 2__Moderate 3__Many

Cocci (30)

0__None 1__Few 2__Moderate 3__Many

Mucus shreds (31)

0__None 1__Few 2__Moderate 3__Many

Crystals

| | | |
|--------------------------|--|----|
| Amorphous urate..... | | 32 |
| Uric Acid..... | | 33 |
| Ammonium biurate..... | | 34 |
| Amorphous sediment..... | | 35 |
| Sulfa..... | | 36 |
| Calcium Oxalate..... | | 37 |
| Calcium carbonate..... | | 38 |
| Amorphous Phosphate..... | | 39 |
| Triple phosphate..... | | 40 |
| Calcium Phosphate..... | | 41 |
| Other (specify_____) | | |

0.None
1.Few
2.Moderate
3. Many

TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH
Texas Medical Center
Houston 25, Texas

Requested by _____ M.D. Clinic _____ Station _____

Specimen obtained: Date _____ Time _____ AM PM Non-TIRR _____

Source of blood: V Venous C Capillary A Arterial H Arterialized capillary or venous (23)

Condition of patient: F Fasting P 2 hrs.p.c. R Random (24)

Please check analyses needed

Proteins: x in 60
25-28 Total serum protein ☐ ☐ ☐ ☐ g% 1801 05
29-31 Albumin ☐ ☐ ☐ ☐ g% 1802 05
32-35 Globulin ☐ ☐ ☐ ☐ g% 1803 00
36-39 Gamma globulin ☐ ☐ ☐ ☐ g% 1834 05
Serum protein electrophoresis 1826 15
40-42 Albumin ☐ ☐ ☐ ☐ g%
43-45 Alpha₁ globulin ☐ ☐ ☐ ☐ g%
46-48 Alpha₂ globulin ☐ ☐ ☐ ☐ g%
49-51 Beta globulin ☐ ☐ ☐ ☐ g%
52-55 Gamma globulin ☐ ☐ ☐ ☐ g%
56-59 Abnormal globulin ☐ ☐ ☐ ☐ g%
60-63 Hemoglobin type ☐ ☐ ☐ ☐ 1835 15
(electrophoresis)

Lipids: x in 61
25-28 Total lipids, fstg. ☐ ☐ ☐ ☐ mg% 1820 05
29-32 do after cream ☐ ☐ ☐ ☐ mg% 1820 05
33-35 meal ☐ hrs. ☐ min.

43-46 Cholesterol ☐ ☐ ☐ ☐ mg% 1806 06

Hormones
52-55 PBI ☐ ☐ ☐ ☐ mcg% 1808 15

Inorganic: x in 62
25-26 Bicarbonate ☐ ☐ ☐ ☐ mEq/l 1812 08
27-29 Chloride ☐ ☐ ☐ ☐ mEq/l 1813 05
30-32 Sodium ☐ ☐ ☐ ☐ mEq/l 1814 06
33-36 Potassium ☐ ☐ ☐ ☐ mEq/l 1815 06
37-40 Magnesium ☐ ☐ ☐ ☐ mEq/l 1816 08
41-44 Calcium ☐ ☐ ☐ ☐ mEq/l 1817 06
45-49 Phosphate (inorg) ☐ ☐ ☐ ☐ mM/l 1818 05

50-53 pH ☐ ☐ ☐ ☐ mg% 1819 10
54-56 Iron ☐ ☐ ☐ ☐ mcg% 1828 08
57-59 Iron binding capy. ☐ ☐ ☐ ☐ mcg% 1829 10

Other (specify) _____

Carbohydrate: x in 63
25-27 Glucose, fasting ☐ ☐ ☐ ☐ mg% 1805 05
28-31 ☐ ☐ ☐ ☐ g glucose orally I i.v.
32-34 Glucose, 1hr after ☐ ☐ ☐ ☐ mg% 1805 05
35-37 Glucose, 2hr after ☐ ☐ ☐ ☐ mg% 1805 05
38-40 Glucose, 3hr after ☐ ☐ ☐ ☐ mg% 1805 05
41-46 ☐ ☐ ☐ ☐ hr ☐ ☐ min after ☐ ☐ ☐ ☐ mg% 1805 05
47-52 ☐ ☐ ☐ ☐ hr ☐ ☐ min after ☐ ☐ ☐ ☐ mg% 1805 05

Nitrogenous:
53-55 Urea (BUN) ☐ ☐ ☐ ☐ mg% 1804 05
56-59 Creatinine ☐ ☐ ☐ ☐ mg% 1811 05
60-63 Uric acid ☐ ☐ ☐ ☐ mg% 1810 05

Enzymes: x in 64
25-29 Alkaline phosphatase ☐ ☐ ☐ ☐ units 1845 08
30-33 Acid phosphatase ☐ ☐ ☐ ☐ units 1824 08
34-37 Prostatic p'tase ☐ ☐ ☐ ☐ units 1840 08
38-40 Amylase ☐ ☐ ☐ ☐ units 1807 08
41-44 Lipase ☐ ☐ ☐ ☐ units 1833 08

45-48 Lactic deH'ase ☐ ☐ ☐ ☐ units 1853 10
59-62 G O transaminase ☐ ☐ ☐ ☐ units 1809 08
63-66 G P Transaminase ☐ ☐ ☐ ☐ units 1848 08
67-69 Prothrombin, plasma ☐ ☐ ☐ ☐ % 1846 06
70-72 Prothrombin serum ☐ ☐ ☐ ☐ % 1849 06

Liver function: x in 65
25-28 Bilirubin, total ☐ ☐ ☐ ☐ mg% 1842 05
29-32 Bilirubin, direct ☐ ☐ ☐ ☐ mg% 1843 05
33-35 BSP retention ☐ ☐ ☐ ☐ % 1841 05
5 mg/kg, 45 min
36 Cephalochol. floc. ☐ ☐ ☐ ☐ plus 1844 05
37-38 Thymol turbidity ☐ ☐ ☐ ☐ units 1847 05
39-41 Icterus index ☐ ☐ ☐ ☐ units 1852 05

Fluid compartments: x in 66
25-28 Evans blue space ☐ ☐ ☐ ☐ liters 1858 20
29-32 Thiocyanate space ☐ ☐ ☐ ☐ liters 1859 20
33-36 Antipyrine space ☐ ☐ ☐ ☐ liters 1860 20

Date analyzed _____ Analyzed by _____ Card code 18 (79-80)

73-78

Printout: x in 60, 61 on A; 62, 63 B, 64, 65 C, 66, 67 D.

BLOOD CHEMISTRY SOURCE DOCUMENT

TIRR-LAB-#6 - 5/62

Patient's number and name(1-11)

TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH

Requested by _____ M. D. Clinic _____ Station _____

Specimen obtained: to Date _____ From Date: _____ Time _____ AM PM Non - TIRR _____

Specimen: V _____ Voiced C _____ Catheterized (23) 12-17 18-22

R _____ Random N _____ Night (voided on awakening) M _____ Morning (voided after discarding night urine) (24)
 _____ Timed specimen of hr. min. (ending at time shown above) (25-28)

Volume of specimen: ml. (29-32)

Please check analyses needed.

| Amount in specimen | | x in 60 | |
|--------------------|--|----------------------|----------------------|
| 33-35 | Chloride mEq | <input type="text"/> | .2202 06 |
| 36-38 | Sodium mEq | <input type="text"/> | .2203 07 |
| 39-41 | Potassium. mEq | <input type="text"/> | .2204 07 |
| 42-45 | Magnesium. mEq. | <input type="text"/> | .2205 10 |
| 46-49 | Calcium. mEq. = _____ mg. | <input type="text"/> | .2206 10 |
| 50-54 | Phosphate. mM = _____ mg. as P | <input type="text"/> | .2207 06 |
| Amount in specimen | | | |
| 55-58 | 17-Hydroxycorticoids (17-OH-CS) | <input type="text"/> | mg.2208 15 |
| 59-62 | 17-Ketosteroids (17-KS) | <input type="text"/> | mg.2221 10 |
| 63-67 | 4-Hydroxy-3-methoxymandelic acid (MHMA, VMA). | <input type="text"/> | mg.2222 15 |
| 68 | 5-Hydroxyindoleacetic acid (5HIAA) 0 _____ neg. 1 _____ pos. 2 _____ strongly pos. | <input type="text"/> | .2215 05 |

| | | x in 61 | |
|-------|----------------------------------|----------------------|---|
| 33-36 | Protein. | <input type="text"/> | g in specimen2201 05 |
| 37-40 | Creatine(as Creatinine). | <input type="text"/> | g in specimen2210 12 |
| 41-44 | Creatinine | <input type="text"/> | g in specimen2211 06 |
| 45-47 | Creatinine clearance*. | <input type="text"/> | ml/min/1.73 sq.m.2212 11 |
| 48-49 | PSP** | <input type="text"/> | % excreted in 15 min.2213 05 |
| 50-53 | | <input type="text"/> | % excreted in _____ min.2213 05 |
| 54-57 | | <input type="text"/> | % excreted in _____ min.2213 05 |

* For this test, time shown for specimen obtained is time of blood drawing.
 ** For this test, time shown for specimen obtained is time of dye injection.

| | | x in 62 | |
|-------|--|----------------------|---|
| 33-35 | Glucose. | <input type="text"/> | g in specimen.2209 05 |
| 36-39 | Xylose | <input type="text"/> | g in specimen.2223 08 |
| 40 | Diagnex Blue A _____ below 0.3 mg. (achlorhydria) H _____ 0.3-0.6 mg. (hypochlorhydria) N _____ above 0.6 mg. (no achlorhydria). | <input type="text"/> | .2220 05 |
| 41-43 | Urobilinogen, qual. | <input type="text"/> | Positive at dilution of 1 to _____2224 05 |
| 44-46 | Urobilinogen, quant. | <input type="text"/> | Ehrlich units in specimen = EU/2hr.2225 06 |
| 47-50 | Lactic dehydrogenase (LDH) | <input type="text"/> | units.2219 10 |

Other (specify) _____ x in 63

Date analyzed _____ Analyzed by _____ Card code (79-80)

Print out: x in 60 and 61 on A, 62 and 63 on B Patient's name and number (1-11)

URINE CHEMISTRY SOURCE DOCUMENT
 TIRR #9
 4/62

Clinic _____ Station _____

TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH

IN THE

TEXAS MEDICAL CENTER

1333 MOORSUND AVENUE

HOUSTON, TEXAS

Requested by: _____ M. D.

Specimen obtained: Date _____ Time _____ AM
PM

6-16

17-26

Clinical diagnoses: _____

Reason for request _____
(This line must be filled in!)

Please check analyses needed:

(x in 60)

Appearance

Color (27)

B _____ Brown T _____ Tarry C _____ Clay Other (specify) _____

Consistency (28)

F _____ Formed W _____ Watery H _____ Hard Other (specify) _____

Abnormal contents (29)

B _____ Gross Blood P _____ Pus M _____ Mucus Other (specify) _____

30 _____ Fat (sudan red) 0 - 4+

31 _____ Starch (iodine test) 0 - 4+

32 _____ Occult blood (guaiac test) 0 - 4+

33 _____ Ova, parasites, and protozoa 0 = Negative P = Positive

Nematodes

Necator americanus (hookworm) 34

Strongyloides stercoralis 35

Ascaris lumbricoides (ascariasis) 36

Enterobius vermicularis (pinworm) 37

Trichuris trichiura (whipworm) 38

Trichinella spiralis (trichinosis) 39

Other (specify) _____

Trematodes (flukes)

(Specify) _____

Cestodes (tapeworms)

Hymenolepis nana (dwarf tapeworm) 44

Other (specify) _____

Protozoa

Endameba histolytica (amebiasis) 55

Endameba coli 56

Giardia lamblia (giardiasis) 57

Other (specify) _____

Other (specify) _____

Date analyzed _____

Analyzed by _____

Card Code 112
79-80

Patient's Name and Number 1-5

ROUTINE FECAL ANALYSIS SOURCE DOCUMENT
TIRR-L-11/59

TEXAS INSTITUTE FOR REHABILITATION AND RESEARCH

Immobilization Study

Requested by _____ M. D.

Specimen obtained: Date _____ Time _____ am
pm

_____ Snack (Description: _____)

_____ Breakfast (Description: _____)

_____ Dinner (Description: _____)

_____ Supper (Description: _____)

_____ Pooled Food of hours. _____ Weight of pooled food for 24 hr. period

_____ Calcium _____ Additional: (Specify)

_____ Phosphate _____

_____ Nitrogen _____

_____ _____

_____ _____

_____ _____

_____ _____

Date analyzed _____ Analyzed by _____

Food Analysis Source Document
IS 5/1/63

Patient's number and name

Texas Institute for Rehabilitation and Research
Immobilization Study

MASTER PROTOCOL

AUGUST 31, 1963 Saturday Physician on call: Dr. Harrison

| Time | Procedures | Responsible |
|--|--|----------------|
| 7 am | finish 12 hour urine collections on all subjects temperatures on all subjects | S, O O |
| 8 am | X-ray densitometry studies on all subjects | M |
| 8:30 am | breakfast | D |
| | ECG on all subjects | T |
| 9 am | exercise program | T |
| 12:30 pm | lunch | D |
| 1:30 pm | exercise program continued | T |
| 5:30 pm | dinner | D |
| 7 pm | finish 12 hour urine collections on all subjects temperatures on all subjects bedside monitoring on all subjects | S, O O T |
| 9 pm | lights out | |
| 11 pm | T. V. off orderly change | |
| CODE: P Physician R Radiology L Laboratory S Subjects D Dietitian M Dr. Mack E Engineers O Orderly T TIRR IS/ August - September | | |